

BER-1560
Data Transmission Analyzer
User's Manual
V2.0



DADI Telecom

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Safety matters

In the whole test process, please comply with common safety prevent norms. If you use the tester without this user manual, and the tester is damaged, DADI Telecom won't undertake any responsibility. Please be sure to obey the following safety norms, lest cause bodily injury or tester damage.

Warning

Battery charging

Charging the battery must use the charger from the manufacturer. You can't use any unauthorized charger, lest cause tester damage or accident.

Battery replacement

Please use the manufacturer configured Li batteries. You can't operate the tester in inflammable or explosive environment. Do not use the tester in environment with inflammable or explosive liquid or steam. In this environment, it will be dangerous with any electrical instruments.

Open rear cover

Unless you want to replace modules, please don't open rear cover or bottom cover. The replace must be operated by formal trained stuff. There is high voltage in some areas inside the tester which will cause dangerous if it is mishandled.

LCD

If the LCD is damaged and liquid outflows, please don't inhaled it into mouth or splash on skin. If the liquid is splashed into eye or mouth, please immediately rinse with water and go to the hospital; if the liquid is splashed on skin or clothes, please wipe with alcohol firstly, and then wash with soap and water. In addition, take care, don't be scratched by glass fragments, don't touch the border of glass fragments.

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Chapter 1 General

BER-1560 Data Transmission Analyzers are series of handheld and battery-operated communications test sets, which can be applied in E1 digital circuit, DDN and error bit test for data communication system with the transport fiber or microwave.

The BER-1560 can simultaneously monitor error bit of dual E1 circuits, it also performs G.703 E1, T1, G.703 64K, V.24/RS232, V.35, V.36/RS449, X.21 and EIA530 interface error and alarm test, supported rate from 64kb/s to 2.048Mb/s, NX56K and NX64K rate. In addition, it can perform IP PING test to Ethernet.

Functions

- Simultaneous monitoring of dual-E1 or T1 circuit
- In-Service monitoring of PCM30/PCM31/PCM30C/PCM31C frame
- Out-of-Service test of Frameless, PCM30/PCM31/PCM30C/PCM31C frame
- NX64K test
- Bit, Code, FAS, CRC error injection and test, SLIP code test
- SLIP Test
- Frame word, Signaling and time slot data viewing
- Error analysis confirming to ITU-T G.821, G.826 and M2100 recommendations
- Test pattern variety of options
- Loop-back delay measurement
- APS measurement
- Histogram
- Voice & Frequency Measurement*, Pulse Mask*
- Support G.703 64K interface*, V series test interface *

- IP PING test
- Test result storage function: storing more than 5000 pieces error and alarm events along with the duration & occurrence time and their types
- Large-capacity lithium battery, automatic charging and capacity displaying
- Communicated with PC through RJ45 and support RJ45 network interface and TCP/IP protocol for networking

* only certain product item support these functions

Chapter 2 Inspection

It's absolutely necessary for you to read inspections before unpack package and check the instrument or test. In this chapter, we would like to help you know the initial work status of the instrument.

2.1 Unpack the Instrument

Before unpacking, please check whether there is any damage in the carton and the bag. If any, please sort all of the articles per the packing list and perform self-check according to instructions of the Section 1.4 until the instrument can work normally.

In case that damaged bag or incomplete articles happen or the instrument cannot achieve function tests, please contact us immediately.

2.2 Accessory and Option

Accessories to the BER-1560, please refer to the packing list. If received articles are not the same with what is specified in the packing list, please inform us immediately so as not to make any influence on using.

2.3 Power Supply

The BER-1560 supports two power supply modes, DC and battery, with a built-in large capacity rechargeable lithium battery for 8-hour long consecutive operation after being fully charged.

When using external power supply, the battery will charge automatically with the battery capacity shown on the right top corner of LCD of BER-1560 at any moment.

When using AC power, please use the AC charger accompanied, or the instrument will be damaged.

Precautions:

! Don't dispose wasted battery in water or fire for fear of backfire or pollution.

! Don't make the two poles of the battery in short circuit for fear of dangers.

! Don't make battery close to fire source or use in high temperature for fear of severe personal injury.

2.4 Self-Test

In order to guarantee a reliable test result, we suggest you to have a self-test according to the following steps each time before switching on for testing.

Step	Operation	Description
1	Power On	One slight click of "Pwr" key with Beep tone and after 10 odd seconds, enters the main menu.
2	Check Battery Capacity	If Battery Capacity shown on the first row of LCD indicates insufficiency, in this case you should use the AC Charger accompanied with the instrument to supply electricity.
3	Initialization Self-Check	In the main menu, enter the "System" menu, select " Self-Test" and after 10 odd seconds, self-Test result is displayed on LCD, with "OK!" as having been passed.

If the self-test result shown as "Fail!", please immediately inform the distributor or factory for maintenance.

Chapter 3 Operation Keys

3.1 Abbreviation

All tests can be done according to the key-operation on the screen. All of the abbreviations used are listed as following for your reference.

Acronym	Meaning
LOS	Loss of signal
AIS	Alarm indication signal
LOF	Loss of frame
LOMF	Loss of Multi-frame
LOP	Loss of Pattern
RDI	Remote defect Indication
FAS	Frame Alignment Signal
CAS	Channel associated signaling
CRC	Cyclic Redundancy Check
EB	Error Block
BBE	Background Block Error
PCM30C	PCM30 CRC
PCM31C	PCM31 CRC
PRBS	Pseudo Random Bit Sequence
TSE	Time Slot Error Bit
ES	Error Second
SES	Severely Error Second
EFS	Error Free Seconds
UAS	Unavailable Second
DTE	Data Terminal Equipment
DCE	Data Communication Equipment

3.2 Record and Storage

What is recording? Please see the following example,

It's the one-day working schedule of an office maintainer:

Schedule	Test work	Time
Morning	E1 in-service monitoring 5 hrs	8:30-13:30
Afternoon	E1 out-of-service test 4 hrs	14:00-18:00

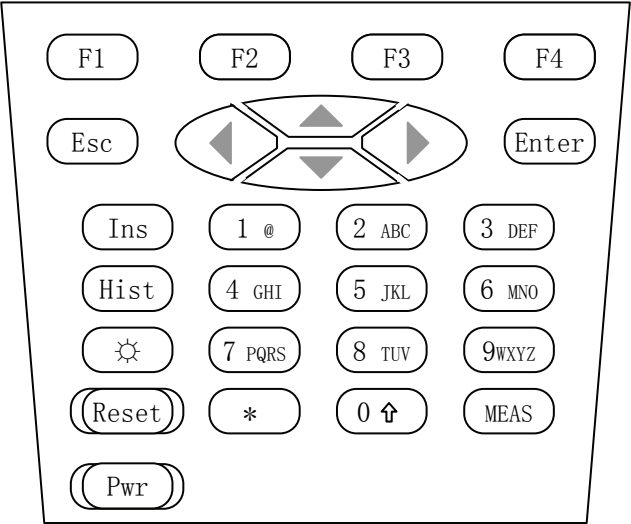
Obviously, in order to store the two test results, the test data should be stored separately. And we mark these two test tasks as “Record 1” & “Record 2”, which is the meaning of recording, one record represents an isolated test task. The BER-1560 can set 20 records and store 20 independent test data.

As data quantity in each test is unknown, storage cells needed are uncertain. In order to take advantage of the limited storage cells in maximum, storage cells distributed to every record are to be decided by the test results. The total storage capacity is 512Kbit. If one record occupies the entire storing room, then other records will be invalid; if this record only uses part of the storage cells, then other records may utilizes the remaining storage cells until being full.

After the storage room is full, if the test is still not finished, the BER-1560 can test continuously. The original stored content will keep unchangeable while later detailed error events are not to be stored. However, the BER-1560 will store the total test results when the test is done.

Recorded content can be accessed, printed in details or part or whole deleted easily. These operations will be described in details in the following chapters.

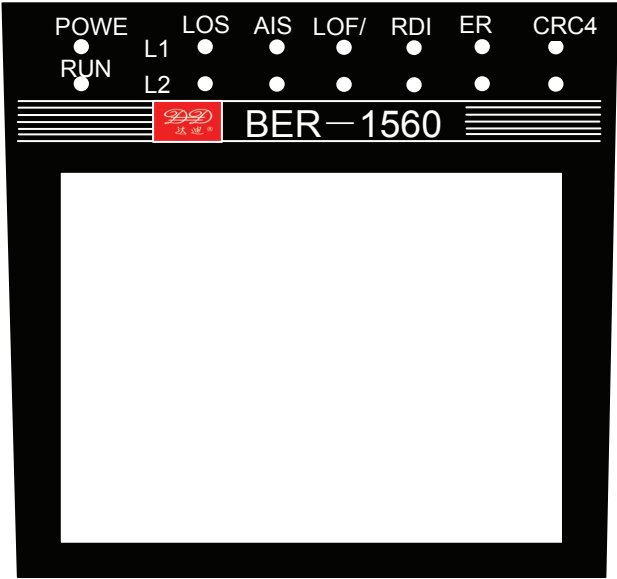
3.3 Keys



The BER-1560 has total 27 keys, namely,

Types	Name	Description
Soft Key	F1~F4	The bottom row on LCD defines these keys.
Cursor	▲▼◀▶	Cursor shift key, shift the cursor in four directions
Esc	Esc	Return to the last menu
ENTER	ENTER	Confirm choices.
Function Key	Ins	Error Injection.
	Hist	Click this key for turning off history alarm light.
	MEAS	Click this key to enter the test menu
Number Key	0~9	Input number.
LCD Control Key	☀	LCD backlight switch key
Reset	Reset	Reset the settings
Power	Pwr	Power switch

3.4 Indicator Light



There are 14 LED indication lights on the BER-1560 front panel, 4 status indicator lights and another 10 alarm indicator lights.

Types	Name	Description
Status indicator light	POWER	⌘: Power indicator
	RUN	⌘: Indicated testing status
	CRC4	⌘: Signal receiving with CRC4 check code (Dual E1 line)
Alarm indicator light	LOS	⌘: No Signal at Rx end
	AIS	⌘: Received AIS alarm at Rx end
	LOF/P	⌘: Loss of Frame (as Loss of Pattern (LOP) in out-of-line bit error)
	RDI	⌘: Remote defect Indication
	ERR	⌘: Error bit indication light

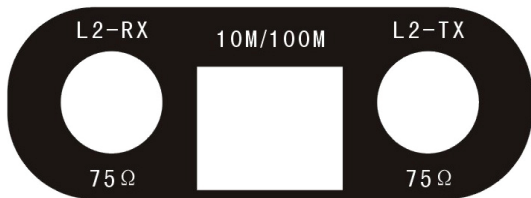
History alarm indication note: flash of the alarm indication light represents history alarm and the light can be switched off clicking the

“Hist” key.

3.5 Interface Description



The above picture is the BER-1560 left interface diagram, in which BNC interfaces on both sides are G.703 E1 unbalanced interfaces with the impedance as 75Ω, L1-RX representing input of L1 and L1-TX representing output of L1; the middle interface is G.703 E1 balanced interface with the impedance as 120Ω(E1/G.703 64K) or 100Ω(T1) including input & output.



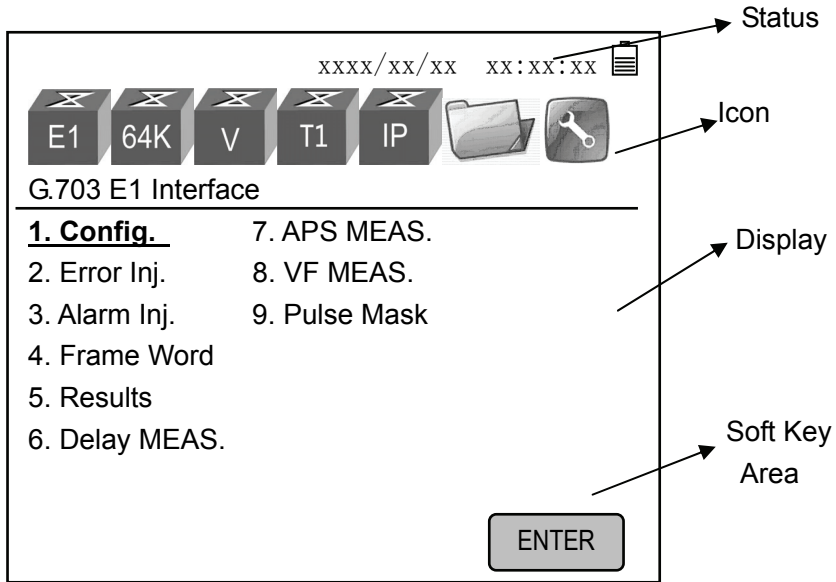
The above picture is the BER-1560 right interface diagram, in which BNC interfaces on both sides are G.703 E1 unbalanced interfaces with the impedance as 75Ω, L2-RX representing input of L2 and L2-TX representing output of L2 the middle interface is a 10M/100M RJ45 network interface.



The above picture is the BER-1560 top interface diagram.

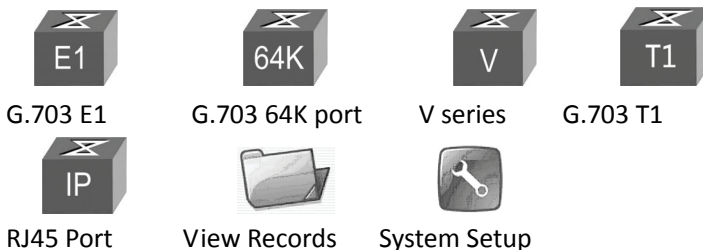
Chapter 4 Menu

Click power key “Pwr” then Display DADI LOGO and model, wait for 5 seconds to access the primary menu.



First Line: status bar, displays indication, date, time, battery capacity. Status (from left to right,) is working status, inject status, suggesting Error code / Alarm inject, testing status (which is not suggested during starting status, only suggest default)

Second Line: Icon, suggests diversified interfaces and functions.



Center area displays the setup and test results, click cursor key to select

main menu and other items, and click ENTER key to confirm selection, return to the last step for click Esc.

The last row display names of the function soft-key in display area.

Chapter 5 G.703 E1 Interface

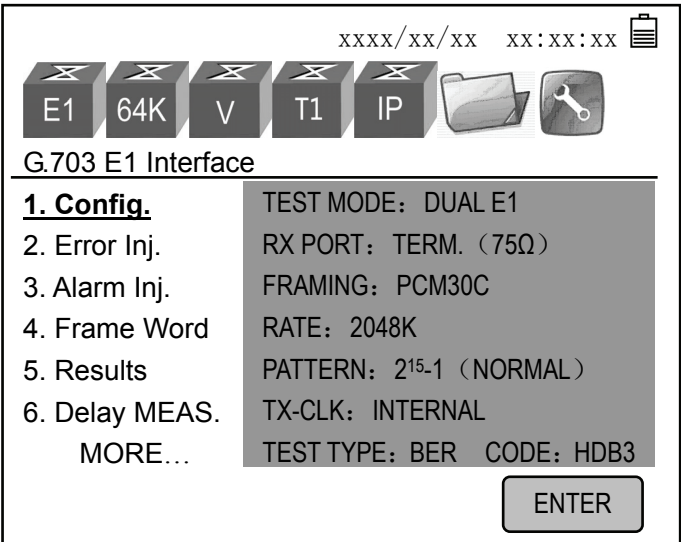
For testing G.703 E1 interface, diversified test for E1 can be done. E1 test include:

NO.	Function	NO.	Function
1	Config.	7	APS MEAS.
2	Error Inj.	8	VF MEAS.*
3	Alarm Inj.	9	Pulse Mask*
4	Frame Word		
5	Results		
6	Delay MEAS.		

5.1 Configuration and Testing

5.1.1 Configuration

In the main menu, select “G.703 E1 Interface” then click the ENTER or “1” number key to access the parameter configuration menu.



The character of selected item is underlined, click cursor right key to choose and change the related parameter, the selected parameter will be highlighted, click the ENTER key for confirming the selected items.

Items' setting options as the chart below,

Parameter	Option	Description
TEST MODE	LINE1	Test Line 1
	DUAL E1	Test Dual Line simultaneously
RX PORT	BRIGDGE	For Through mode
	TERM	For Out-of-Service mode
	MONITOR	For In-Service, with the high interface impedance
IMP.	75Ω	Set the impedance of the interface as 75Ω
	120Ω	Set the impedance of the interface as 120Ω
FRAMING	UNFRAME	Frameless
	PCM30	PCM30
	PCM30C	PCM30 CRC
	PCM31	PCM31
	PCM31C	PCM31 CRC
RATE	2048K	Test rate is 2048kbit/s
	NX64K	N=1~31, click Enter key to perform time slot selection, Choose any continuous/noncontiguous time slot.
PATTERN	$2^{15}-1$	Click Enter key to select pattern: $2^n-1, n=9,11,15,20,23$, 1111 , 0000, 0101, customize 8 bit code normal or converse
TX-CLK	L1-RX	Receiving clock of Line 1
	L2-RX	Receiving clock of Line

		2,performing the outer clock test when L2-RX connected to outer clock.
	INTERNAL	Internal clock
	OFFSET	Change the transmitted clock frequency, click Enter key to adjust parameter the range is $\pm 125\text{ppm}$
TEST TYPE	BER	Monitor time slot error for offline test
	LIVE	Monitor frame error for online test.
CODE	HDB3	Test code pattern HDB3
	AMI	Test code pattern AMI

5.1.2 Test

After setting parameters, click “MEAS” enter test menu.

E1-RESULTS

xxx/xx/xx xx:xx:xx

L1-BE: 0

L2-BE: 0

L1-BER: 0

L2-BER: 0

L1-ALARM: OK!

L2-ALARM: OK!

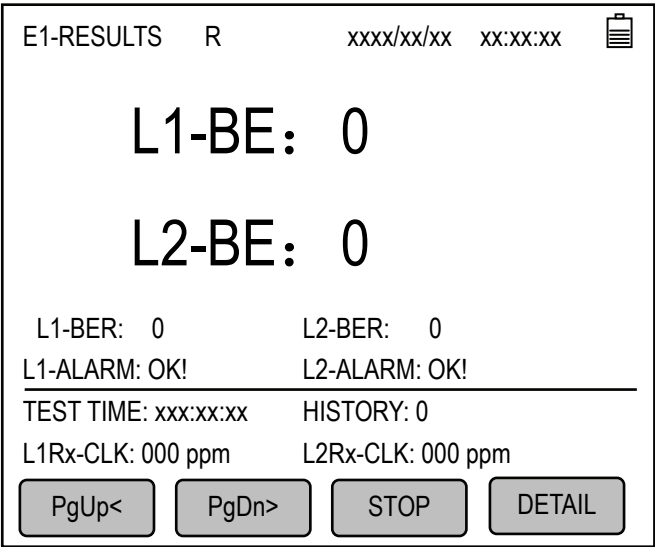
FRAMING: PCM30

PATTERN: 215-1

TX-CLK: INTERNAL

START

As long as click soft definition key F3 “START” it will start the test immediately, as below picture.



When testing, the first line suggest “R”, RUN indicator light on (on the device), via soft key, you can check and flip the test indicators, totally including 12 indicator screens, 1 detailed event screen.

5.1.2.1 Alarm Event


First screen of the test result suggest total alarm event, as follows,

RESULTS

R

xxxx/xx/xx

xx:xx:xx



FRAMING: PCM30C

TX-CLK: INTERNAL

TEST TIME: 000: 00: 00

RATE: 2048K

RX-CLK: 000 ppm

01-REMAIN RAM: 5800

L1

TYPE	COUNT	TIME
LOS	0	0S
AIS	0	0S
LOF	0	0S
RDI	0	0S
LOP	0	0S
SLIP	0	0S

PgUp<

PgDn>

STOP

DETAIL

Framing: frame structure of present signal;

TX-CLK : signal mode of Tx clock, the suggested is inner clock;

TEST TIME: indicate test time, from start to present (minute, second);

ALARM: indicate present alarm inspected, for history alarm, it is suggested by indicator light;

RX-CLK: offset between standard value and inspected clock at Rx end, unit: ppm;

REMAIN: remained storage capacity of device;

TYPE: alarm type list;

COUNT: alarm times;

TIME: total time alarm sustained;

SLIP: slip code.


5.1.2.2 Error BIT Count/Rate

RESULTS

R

xxxx/xx/xx

xx:xx:xx



FRAMING: PCM30C

TX-CLK: INTERNAL

TEST TIME: 000: 00: 15

RATE: 2048K

RX-CLK: 000 ppm

01-REMAIN RAM: 5800

LINE1—ERROR BIT COUNT/RATE

TYPE	COUNT	RATE
CODE	0B	0.000E+00
BIT	0B	0.000E+00
FAS	0B	0.000E+00
CRC4	0B	0.000E+00
E_BIT	0B	0.000E+00

PgUp<

PgDn>

STOP


DETAIL

TYPE: alarm type list;

COUNT: errors quantity;

RATE: average error rate for errors.

5.1.2.3 RX-CLK/Frequency

RESULTS R xxxx/xx/xx xx:xx:xx 

FRAMING: PCM30C TX-CLK: INTERNAL

TEST TIME: 000: 00: 15 RATE: 2048K

LINE1—RX-CLK/FREQUENCY

FREQUENCY	2048000Hz
MAX.FREQ.	2048000Hz
MIN.FREQ.	2048000Hz


PgUp<

PgDn>

STOP

DETAIL

5.1.2.4 G.821 (BIT) Standard

RESULTS R xxxx/xx/xx xx:xx:xx 

FRAMING: PCM30C TX-CLK: INTERNAL

TEST TIME: 000: 00: 15 RATE: 2048K

RX-CLK: 000 ppm 01-REMAIN RAM: 5800

LINE1—G.821 (BIT)

TYPE	COUNT	RATE
BIT	0S	0.000E+00
ES	0S	0%
SES	0S	0%
EFS	15S	100.0%
UAS	0S	0%

PgUp<


PgDn>

STOP

DETAIL

ES: Error Second; SES: Serious error second EFS: Error free seconds
UAS: Unavailable second.

5.1.2.5 G.826 (CRC) Standard

RESULTS R xxxx/xx/xx xx:xx:xx 

FRAMING: PCM30C TX-CLK: INTERNAL

TEST TIME: 000: 00: 16 RATE: 2048K

RX-CLK: 000 ppm 01-REMAIN RAM: 5800

LINE1—G.826 (CRC)

TYPE	COUNT	RATE
EB	0B	0.000E+00
BBE	0B	0.000E+00
ES	0B	0%
SES	0B	0%
UAS	0B	0%

PgUp<

PgDn>

STOP

DETAIL

EB: Error block; BBE: Background error block

5.1.2.6 G.826 (E_BIT) Standard

RESULTS
R
xxxx/xx/xx
xx:xx:xx

FRAMING: PCM30C
TX-CLK: INTERNAL

TEST TIME: 000: 00: 17
RATE: 2048 KBIT/S

RX-CLK: 000 ppm
01-REMAIN RAM: 5800

LINE1—G.826 (E_BIT)

TYPE	COUNT	RATE
EB	0B	0.000E+00
BBE	0B	0.000E+00
ES	0B	0%
SES	0B	0%
UAS	0B	0%

PgUp<
PgDn>
STOP
DETAIL

5.1.2.7 M2100 (CRC) Standard

RESULTS
R
xxxx/xx/xx
xx:xx:xx

FRAMING: PCM30C
TX-CLK: INTERNAL

TEST TIME: 000: 00: 18
RATE: 2048 KBIT/S


RX-CLK: 000 ppm
01-REMAIN RAM: 5800

LINE1—M2100 (CRC)

TYPE	COUNT	RATE
ES	0B	0%
SES	0B	0%
EFS	18S	100.0%

PgUp<
PgDn>
STOP
DETAIL

5.1.2.8 M2101 (CRC) Standard

RESULTS R xxxx/xx/xx xx:xx:xx 

FRAMING: PCM30C TX-CLK: INTERNAL

TEST TIME: 000: 00: 18 RATE: 2048 KBIT/S

RX-CLK: 000 ppm 01-REMAIN RAM: 5800

LINE1—M2101 (CRC)

TYPE	COUNT	RATE
ES	0B	0%
SES	0B	0%
EFS	18S	100.0%


PgUp<

PgDn>

STOP

DETAIL

5.1.2.9 Event Detail

TEST RESULTS R xxxx/xx/xx xx:xx:xx 

RECORD 01 1 OF 1

NO.	TYPE	START TIME	COUNT
0001	CODE	xx:xx xx:xx:xx	1

PgUp<

PgDn>

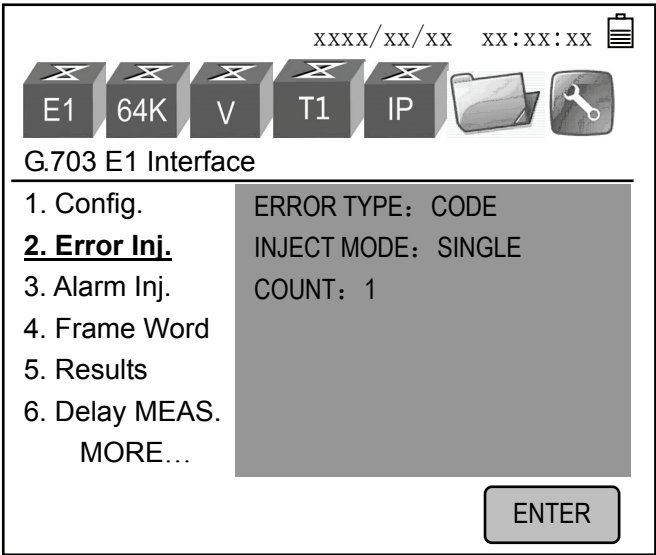
STOP

RETURN

NO.: record events with sequence from small to big, max quantity: 9999 items;
TYPE: error or alarm type, “-1” or “-2” suggests line 1 or line 2;
START TIME: local time of the events, year/month/date;
COUNT: errors quantity or alarm sustained time.

5.2 Error Injection

In the main menu, select “G.703 E1 Interface” then click the cursor key or 2 key to access the Error Injection menu.



Right click cursor key or click “ENTER” to enter error inject settings, as follows,

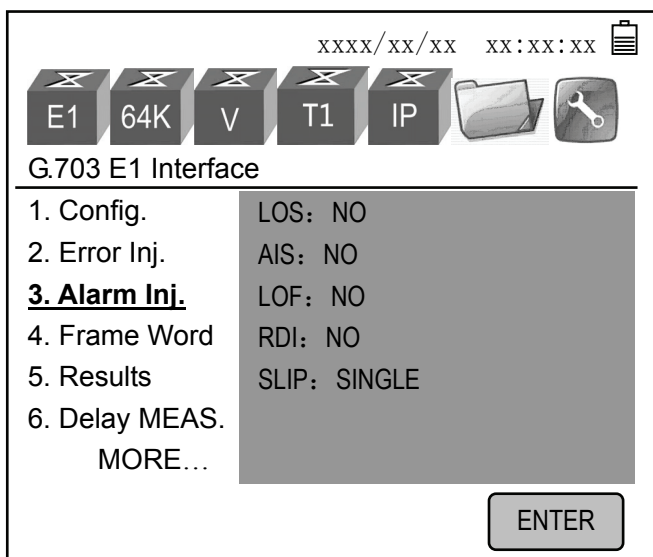
Parameter	Option	Description
ERROR TYPE	CODE	Error type is Code
	BIT	Error type is Bit
	FAS	Error type is FAS
	CRC4	Error type is CRC4

INJECT MODE	SINGLE	Inject signal error
	RATE	Inject error as per rate.
COUNT	1	Via “-1” or “+1”, or click number key enter quantity that for errors that can be injected each time. (0~9)
RATE	1E-04	As per rate 10^{-4} , 10^{-5} , 10^{-6} , 10^{-7} , 10^{-8} inject errors.

Select error inject type, click “Ins” and inject error, soon “Ins” will be suggested in the first line status bar on Screen.

5.3 Alarm Injection

In the main menu, select “G.703 E1 Interface” then clicks the cursor key or the “3” key to access the Alarm Injection menu.



Click cursor right key or ENTER key access to alarm injection, as below.


Parameter	Option	Description
Alarm Type	LOS	Loss of signal

	AIS	Alarm indication signal
	LOF	Loss of frame
	RDI	Remote defect Indication
	SLIP	Slip code

Move cursor key to the alarm injection, select “YES” or “NO” by soft key, when “YES” selected, there will be “Ins” on the first status bar on screen.

5.4 Frame Word

In the main menu, select “G.703 E1 Interface” then click the cursor key or the 4th key to access the Frame Word menu.

xxxx/xx/xx xx:xx:xx 

FRAME WORD SETUP									
		Si	1	A	Sa	Sa	Sa	Sa	Sa
CRC4: YES	C	1	0	1	1	1	1	1	1
E_BIT: 1 1	C	1	0	1	1	1	1	1	1
FAS WORD:	C	1	0	1	1	1	1	1	1
C0011011	C	1	0	1	1	1	1	1	1
MFAS WORD:	C	1	0	1	1	1	1	1	1
00001011	C	1	0	1	1	1	1	1	1
MFAS abcd		1	1	0	1	1	1	1	1
1001		1	1	0	1	1	1	1	1

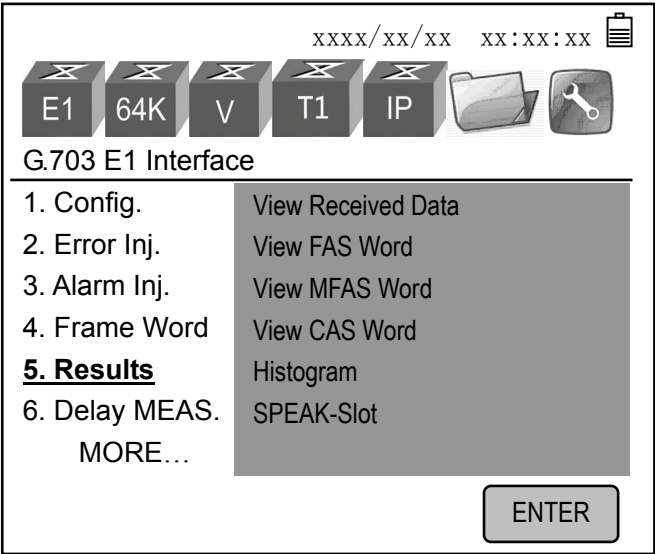
1

0

Configure such as CRC4, E Bit, Sa Bit etc framing word.


5.5 Results

In the main menu, select “G.703 E1 Interface” then click the cursor key or “5” key to access the View Results menu.



Click cursor right key or ENTER key enter view results, and view all received data of binary code, frame synchronization code, multi-frame synchronization code, channel Associated Signaling, and histogram.

5.5.1 View Received Data

xxxx/xx/xx xx:xx:xx 

LINE1—RECEIVED DATA 1 OF 64

F0


SLOT	BIN	HEX	ASCII
00	00011011	1b	
01	10011110	9e	
02	10000010	82	
03	10111000	b8	
04	11110000	f0	
05	01101101	6d	m
06	11011110	de	
07	10010011	93	

PgUp<

PgDn>

PAUSE

5.5.2 View FAS Word

xxxx/xx/xx xx:xx:xx 

LINE1—FAS WORD


F	C0011011	F	i1ASSSS
00	00011011	01	10011011
02	10011011	03	00011011
04	10011011	05	00011011
06	00011011	07	00011011
08	10011011	09	10011011
10	00011011	11	00011011
12	00011011	13	10011011
14	00011011	15	10011011

PgUp<

PgDn>

PAUSE

5.5.3 View MFAS Word

xxxx/xx/xx xx:xx:xx 

LINE1—MFAS WORD


F	0000xyxx	F	abcdabcd
00	00001011	01	10011001
02	10011001	03	10011001
04	10011001	05	10011001
06	10011001	07	10011001
08	10011001	09	10011001
10	10011001	11	10011001
12	10011001	13	10011001
14	10011001	15	10011001

PgUp<

PgDn>

PAUSE

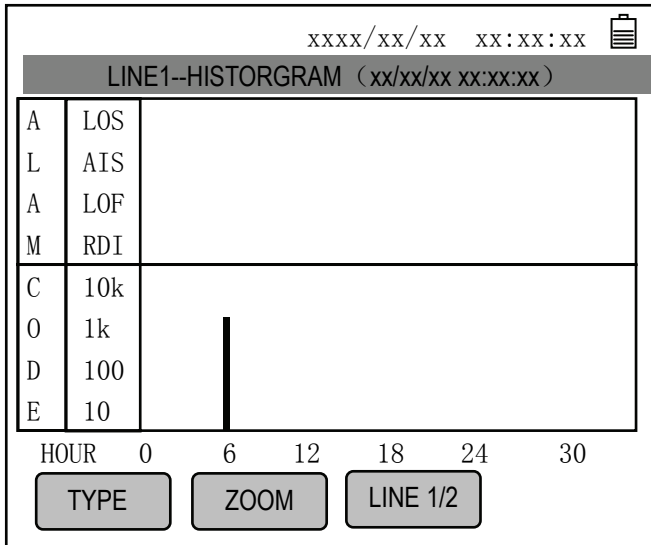
5.5.4 View CAS Word

CAS WORD xxxx/xx/xx xx:xx:xx 


1-01	1001	1001	1001	2-01	0000	0000	0000
1-04	1001	1001	1001	2-04	0000	0000	0000
1-07	1001	1001	1001	2-07	0000	0000	0000
1-10	1001	1001	1001	2-10	0000	0000	0000
1-13	1001	1001	1001	2-13	0000	0000	0000
1-16	1001	1001	1001	2-16	0000	0000	0000
1-19	1001	1001	1001	2-19	0000	0000	0000
1-22	1001	1001	1001	2-22	0000	0000	0000
1-25	1001	1001	1001	2-25	0000	0000	0000
1-28	1001	1001	1001	2-28	0000	0000	0000

PAUSE

5.5.5 Histogram



5.5.6 SPEAK-Slot

SPEAK-Slot XXXX/XX/XX XX:XX:XX 

LINE1-SLOT PCM30C	LINE2-SLOT PCM30C
F 01 02 03 04 05	F 01 02 03 04 05
06 07 08 09 10 11	06 07 08 09 10 11
12 13 14 15 16 17	12 13 14 15 16 17
18 19 20 21 22 23	18 19 20 21 22 23
24 25 26 27 28 29	24 25 26 27 28 29
30 31	30 31

SPEAKER: OFF TS: 01 SPEAKER: OFF TS: 01

VOLUME: -----

TX-abcd: 1011 TS:01

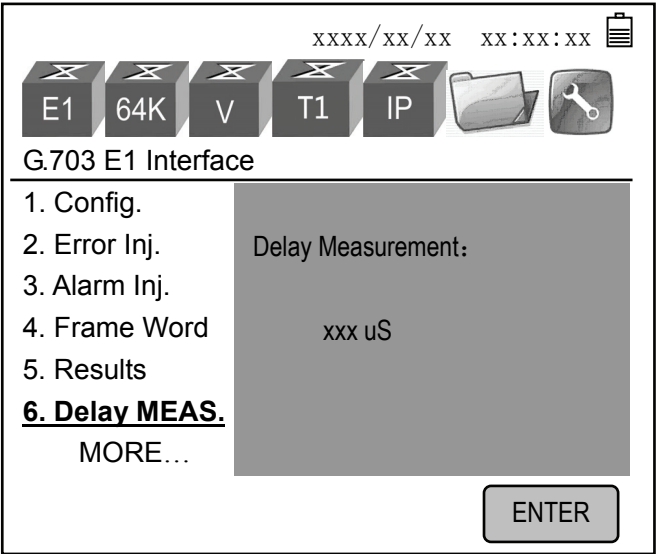
RX-abcd: 1011 TS:01

ON

OFF

5.6 Delay Measurement

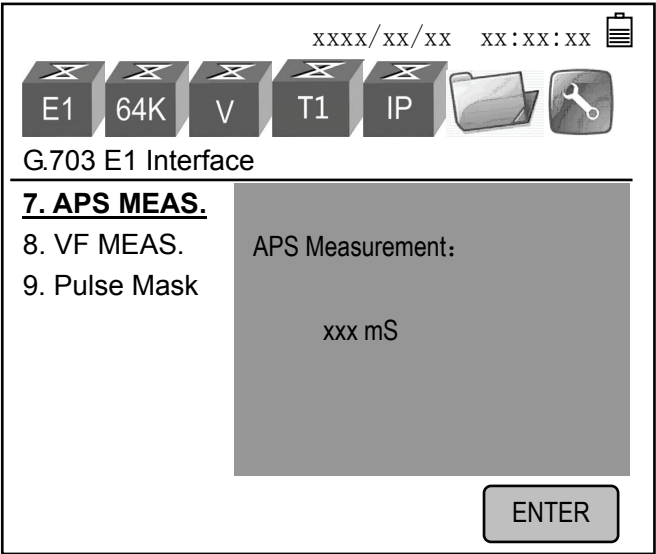
In the main menu, select “G.703 E1 Interface” then click the cursor key or “6” key to access the Alarm Injection menu.



Click “ENTER” key access to delay measurement, the value of delay measurement displayed by microsecond.

5.7 APS Measurement

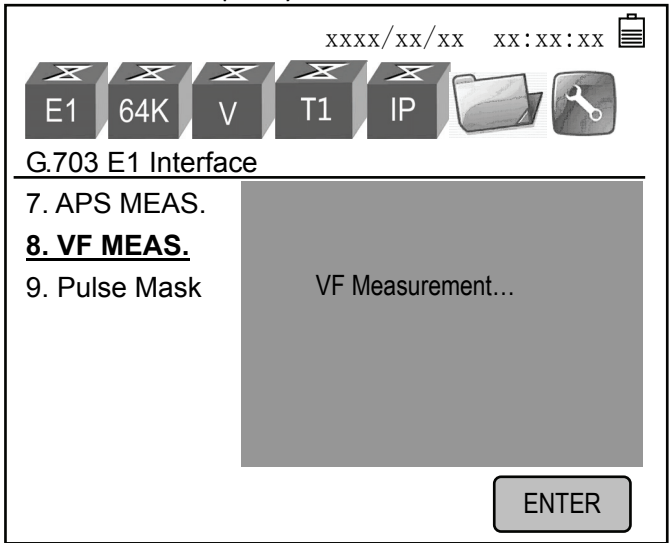
In the main menu, select “G.703 E1 Interface” then click the cursor key or “7” key to access the APS Measurement menu.




Click “ENTER” key access to APS measurement that will be displayed with microsecond

5.8 Voice & Frequency Measurement*

This function is only equipped for some product item. In the main menu, select “G.703 E1 Interface” then clicks the cursor key or “8” key to access the Voice & Frequency Measurement menu.



Click “ENTER” access to the V&F setup menu as below.

xxxx/xx/xx xx:xx:xx 

VOICE FREQUENCY MEASUREMENT

TX-FREQ.: 1800 Hz	RX-FREQ: 1800Hz
TX-LVL: 3dB	RX-LVL: 3.0dB
TX-T/S: 01	RX-T/S: 01

SPEAKER: L1
 SPEAK SLOT: 01
 VOLUME: -----

-1

+1

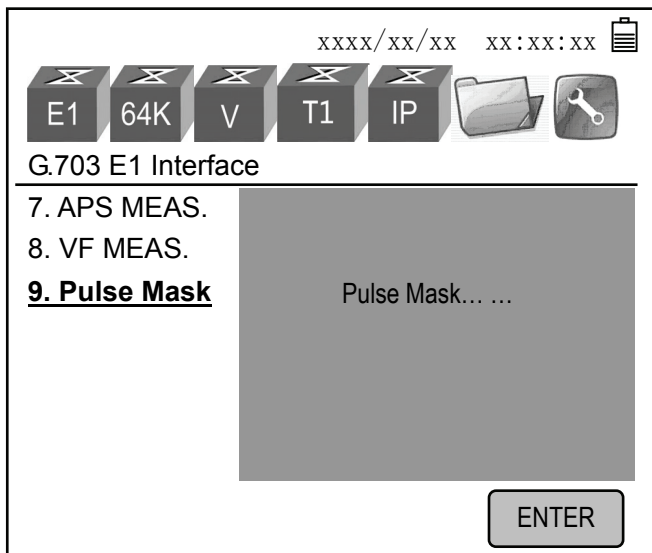
-10

+10

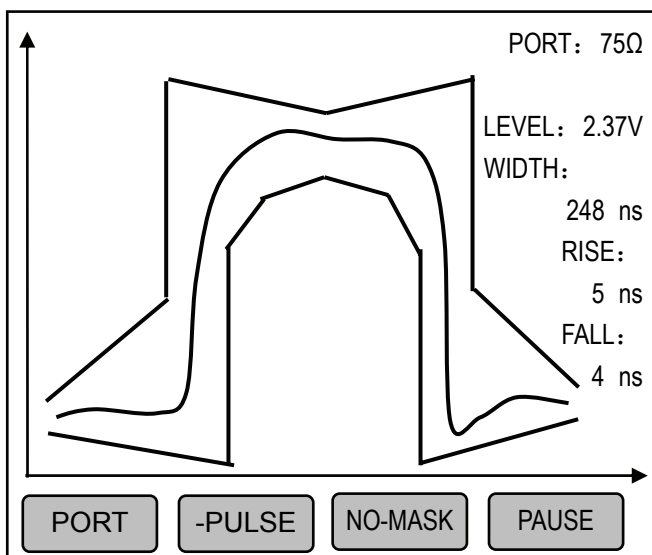
Set abcd code, Tx frequency, Tx level, or selected monitor channel.

5.9 Pulse Mask*

This function is only equipped for some product item. In the main menu, select “G.703 E1 Interface” then clicks the cursor key or “9” key to access the Pulse Mask analysis menu.



Click “ENTER” to perform the signal waveform test as below.

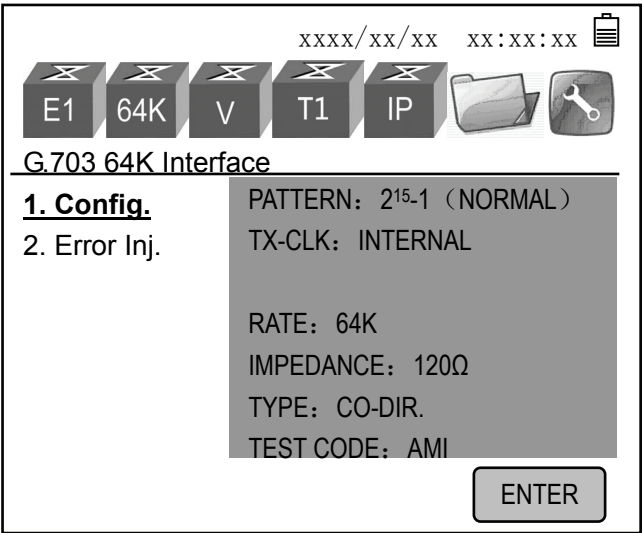


Chapter 6 G.703 64K Interface Test*

This function is only equipped for some product item. It can test 64K line’s error indicators through G.703 64K error test, kinds of errors or alarms can be injected.

6.1 Configuration

In main menu, choose “G.703 64K Interface”, click “ENTER” or cursor downward key to enter “Config.”, as follows,



The clicked item will be underlined, then click cursor right key to revise parameter that will be highlighted, software key is the optional item of parameter, confirm by ENTER key.

Parameter Configuration is as follows,

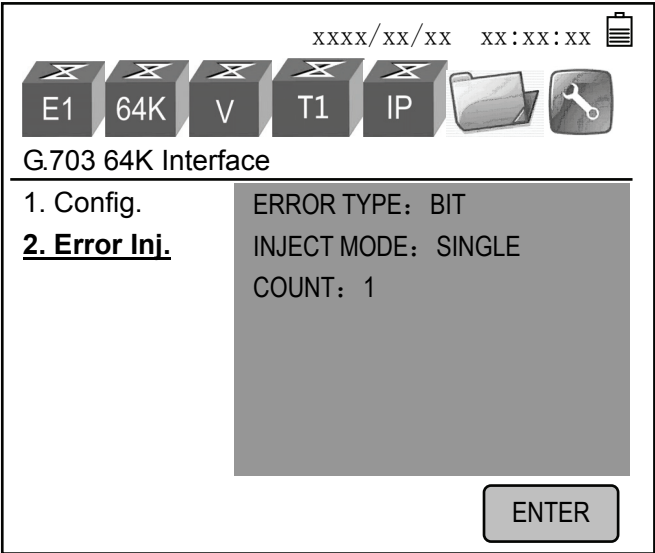
Parameter Configuration	Options	Explanation
PATTERN	2 ¹⁵ -1	2 ⁿ -1,n=9,11,15,20,23, 1111, 0000, 0101, user-defined 8 code.
TX-CLK	INTERNAL	Internal Clock of Tester
	RX-CLK	Clock extracted from signal

After settings of parameter, click “MEAS” to enter test menu. Refer to

4.1.2.

6.2 Error Injection

In main menu, choose “G.703 64K Interface”, click “ENTER” or cursor downward key to enter “Error Inj.”, as follows,



Click cursor right key or “ENTER” to enter settings item, as follows,

Parameter Configuration	Options	Explanation
ERROR TYPE	SINGLE	Insert single error
	RATE	Insert error by rate
INJECT MODE	1	Via “-1” or “+1”, or click number key to confirm errors quantity that can be injected each time. (0~9)
RATE	1E-03	As per rate 10^{-3} , 10^{-4} , 10^{-5} , 10^{-6} , 10^{-7} , 10^{-8} inject errors.

After choosing Inject mode, click “Ins” to inject error, meanwhile “Ins”

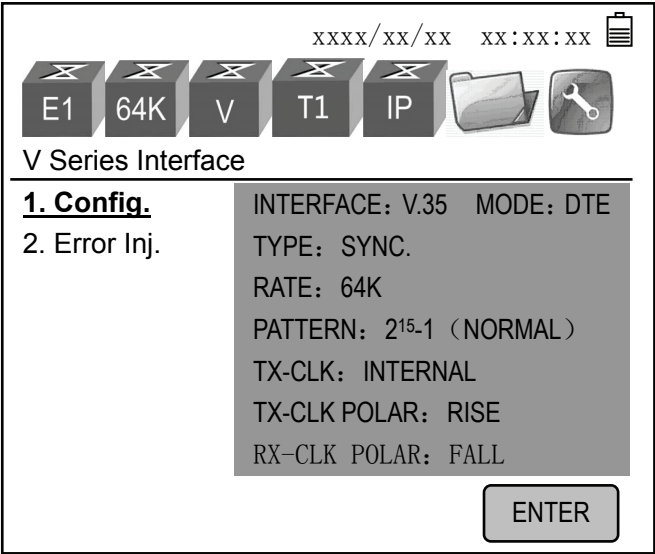
emerges at the first line status bar on LCD.

Chapter 7 V Series Interface Test *

This function is only equipped for some product item. It can off-line test V Series Interface’s error indicators through V Series Interface error test.

7.1 Configuration

In main menu, choose “V Series Interface”, click “ENTER” or cursor downward key to enter “Config.”, as follows,



The clicked item will be underlined, then click cursor right key to revise parameter that will be highlighted, software key is the optional item of parameter, which can be confirmed by ENTER key.

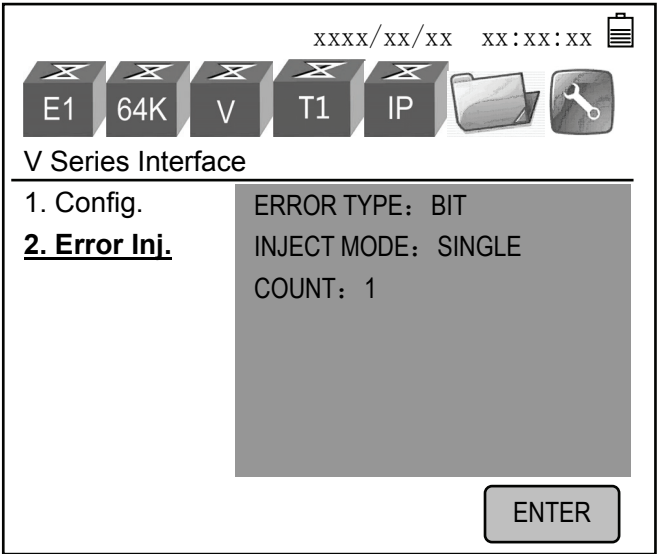
Parameter Configuration	Options	Explanation
-------------------------	---------	-------------

INTERFACE	V.35	To test V.35
	V.24	To test V.24
	V.36	To test V.36
	X.21	To test X.21
	RS530	To test RS530
MODE	DTE	To choose DTE mode
	DCE	To choose DCE
TYPE	SYNC.	synchronous
	ASYN.	asynchronous
RATE	64K	Test rate at most is 2048kbit/s, to choose different rate according to the test type.
PATTERN	$2^{15}-1$	$2^n-1, n=9,11,15,20,23, 1111, 0000, 0101$, user-defined 8 code.
TX-CLK (SYNC.)	INTERNAL	Internal Clock
	RX-CLK	Clock picked from signal, as Tx Clock.
TX-CLK POLAR (SYNC.)	RISE	To choose Rise edge
	FALL	To choose Fall edge
RX-CLK POLAR (SYNC.)	RISE	To choose Rise edge
	FALL	To choose Fall edge
DATA (ASYN.)	8	To choose 5,6,7,8 bit.
CRC (ASYN.)	NONE	To choose none, even or odd.
STOP (ASYN.)	1	To choose 1 or 2.

Set parameter, click "MEAS" key and then "START" key for starting test.

7.2 Error Injection

In main menu, choose “V Series Interface”, click “ENTER” or cursor downward key to enter “Error Inj.”, as follows,



Click cursor right key or “ENTER” to enter settings item, as follows,

Parameter Configuration	Options	Explanation
ERROR TYPE	Single	Insert single error
	Rate	Insert error by rate
INJECT MODE	1	Via “-1” or “+1”, or click number key to confirm errors quantity that can be injected each time. (0~9)
RATE	1E-03	As per rate 10^{-3} , 10^{-4} , 10^{-5} , 10^{-6} , 10^{-7} , 10^{-8} inject errors.

After choosing Inject mode, click “Ins” to inject error, meanwhile “Ins”


emerge at the first line status bar on LCD.

Chapter 8 G.703 T1 Interface Test*

For testing G.703 T1 interface, diversified test for T1 can be done.

8.1 Configuration and Testing

8.1.1 Configuration

xxxx/xx/xx xx:xx:xx 


E1


64K

V

T1

IP





G.703 T1 Interface

1. Config.

2. Error Inj.

3. Alarm Inj.

4. Signal Set

5. Delay MEAS.

6. APS MEAS.

7. Data View

TEST MODE: LINE1

RX: TERM TX:533-655f

FRAMING: ESF+D

RATE: 1544K

PATTERN: 2¹⁵-1 (NORMAL)

TX-CLK: INTERNAL

TEST TYPE: BER CODE: B82S

ENTER

The character of selected item is underlined, click cursor right key to choose and change the related parameter, the selected parameter will be highlighted, click the ENTER key for confirming the selected items. Items' setting options as the chart below,

Parameter	Option	Description
TEST MODE	LINE1	Test Line 1
	DUAL	Test Dual Line simultaneously
RX	BRIGDGE	For Through mode
	TERM	For Out-of-Service mode
	MONITOR	For In-Service, with the high

		interface impedance
TX	0dB	Set the TX as 0dB
	133-266f	Set the TX as 133-266f
	266-399f	Set the TX as 266-399f
	399-533f	Set the TX as 399-533f
	533-655f	Set the TX as 533-655f
	-7.5dB	Set the TX as -7.5dB
	-15dB	Set the TX as -15dB
	-22.5dB	Set the TX as -22.5dB
FRAMING	UNFRAME	Frameless
	D4	D4 frame
	ESF	ESF frame
	D4+D	D4+D frame
	ESF+D	ESF+D frame
RATE	1544K	Test rate is 1544kbit/s
	NX64K	N=1~24, click Enter key to perform time slot selection, Choose any continuous/noncontiguous time slot.
PATTERN	$2^{15}-1$	Click Enter key to select pattern: $2^n-1, n=9,11,15,20,23$, 1111, 0000, 0101, customize 8 bit code normal or converse
TX-CLK	L1-RX	Receiving clock of Line 1
	L2-RX	Receiving clock of Line 2, performing the outer clock test when L2-RX connected to outer clock.
	INTERNAL	Internal clock
	OFFSET	Change the transmitted clock frequency, click Enter key to adjust parameter the range is

		±125ppm
TEST TYPE	BER	Monitor time slot error for offline test
	LIVE	Monitor frame error for online test.
CODE	B82S	Test code pattern B82S
	AMI	Test code pattern AMI

8.1.2 Test

After setting parameters, click “MEAS” enter test menu.

T1-RESULTS

xxxx/xx/xx xx:xx:xx

L1-BE: 0

L2-BE: 0

L1-BER: 0

L2-BER: 0

L1-ALARM: OK!

L2-ALARM: OK!


FRAMING: ESF+D

PATTERN: 215-1

TX-CLK: INTERNAL

START

As long as click soft definition key F3 “START” it will start the test immediately, as below picture.

T1-RESULTS	R	xxxx/xx/xx	xx:xx:xx	
<h1>L1-BE: 0</h1>				
<h1>L2-BE: 0</h1>				
L1-BER: 0		L2-BER: 0		
L1-ALARM: OK!		L2-ALARM: OK!		
TEST TIME: xxx:xx:xx		HISTORY: 0		
L1Rx-CLK: 000 ppm		L2Rx-CLK: 000 ppm		
<button>PgUp<</button>		<button>PgDn></button>	<button>STOP</button>	<button>DETAIL</button>

When testing, the first line suggest “R”, RUN indicator light on (on the device), via soft key, you can check and flip the test indicators, totally including 15 indicator screens, 1 detailed event screen.

8.1.2.1 Alarm Event


First screen of the test result suggest total alarm event, as follows,

RESULTS

R

xxx/xx/xx

xx:xx:xx



FRAMING: ESF+D

TX-CLK: INTERNAL

TEST TIME: 000: 00: 00

RATE: 1544K

RX-CLK: 000 ppm

01-REMAIN RAM: 5800

L1

TYPE	COUNT	TIME
LOS	0	0S
AIS	0	0S
RED	0	0S
YEL	0	0S
LOP	0	0S
SLIP	0	0S

PgUp<

PgDn>

STOP

DETAIL

Framing: frame structure of present signal;

TX-CLK : Signal mode of Tx clock, the suggested is inner clock;

TEST TIME: indicate test time, from start to present (minute, second);

ALARM: Indicate present alarm inspected, for history alarm, it is suggested by indicator light;

RX-CLK: Offset between standard value and inspected clock at Rx end, unit: ppm;

REMAIN: Remained storage capacity of device;


TYPE: Alarm type list;

COUNT: Alarm times;

TIME: Total time alarm sustained;

SLIP: Slip code.

8.1.2.2 Error BIT Count/Rate


RESULTS	R	xxxx/xx/xx	xx:xx:xx	
FRAMING:	ESF+D	TX-CLK: INTERNAL		
TEST TIME:	000: 00: 15	RATE: 1544K		
RX-CLK:	000 ppm	01-REMAIN RAM: 5800		
LINE1—ERROR BIT COUNT/RATE				
TYPE	COUNT	RATE		
CODE	0B	0.000E+00		
BIT	0B	0.000E+00		
FAS	0B	0.000E+00		
CRC6	0B	0.000E+00		
OOF	0B	0.000E+00		
PgUp<		PgDn>		STOP
				DETAIL

TYPE: alarm type list;

COUNT: Errors quantity;

RATE: Average error rate for errors.

8.1.2.3 RX-CLK/Frequency

RESULTS R xxx/xx/xx xx:xx:xx 

FRAMING: ESF+D TX-CLK: INTERNAL

TEST TIME: 000: 00: 15 RATE: 1544K

LINE1—RX-CLK/FREQUENCY

FREQUENCY	1544000Hz
MAX.FREQ.	1544000Hz
MIN.FREQ.	1544000Hz


PgUp<

PgDn>

STOP

DETAIL

8.1.2.4 G.821 (BIT) Standard

RESULTS R xxx/xx/xx xx:xx:xx 

FRAMING: ESF+D TX-CLK: INTERNAL

TEST TIME: 000: 00: 15 RATE: 1544K

RX-CLK: 000 ppm 01-REMAIN RAM: 5800

LINE1—G.821 (BIT)

TYPE	COUNT	RATE
BIT	0S	0.000E+00
ES	0S	0%
SES	0S	0%
EFS	15S	100.0%
UAS	0S	0%

PgUp<

PgDn>

STOP

DETAIL

ES: Error Second; SES: Serious error second EFS: Error free seconds
UAS: Unavailable second.


8.1.2.5 G.826 (CRC) Standard

RESULTS

R

xxxx/xx/xx

xx:xx:xx



FRAMING: ESF+D

TX-CLK: INTERNAL

TEST TIME: 000: 00: 16

RATE: 1544K

RX-CLK: 000 ppm

01-REMAIN RAM: 5800

LINE1—G.826 (CRC)

TYPE	COUNT	RATE
EB	0B	0.000E+00
BBE	0B	0.000E+00
ES	0B	0%
SES	0B	0%
UAS	0B	0%

PgUp<

PgDn>

STOP

DETAIL

EB: Error block; BBE: Background error block


8.1.2.6 G.826 (OOF) Standard

RESULTS

R

xxxx/xx/xx

xx:xx:xx



FRAMING: ESF+D
TX-CLK: INTERNAL

TEST TIME: 000: 00: 17
RATE: 1544 KBIT/S

RX-CLK: 000 ppm
01-REMAIN RAM: 5800

LINE1—G.826 (OOF)

TYPE	COUNT	RATE
EB	0B	0.000E+00
BBE	0B	0.000E+00
ES	0B	0%
SES	0B	0%
UAS	0B	0%

PgUp<

PgDn>

STOP

DETAIL


8.1.2.7 M2100 (CRC) Standard

RESULTS

R

xxxx/xx/xx

xx:xx:xx



FRAMING: ESF+D
TX-CLK: INTERNAL

TEST TIME: 000: 00: 18
RATE: 1544 KBIT/S

RX-CLK: 000 ppm
01-REMAIN RAM: 5800

LINE1—M2100 (CRC)

TYPE	COUNT	RATE
ES	0B	0%
SES	0B	0%
EFS	18S	100.0%

PgUp<

PgDn>

STOP

DETAIL


8.1.2.8 M2101 (CRC) Standard

RESULTS

R

xxxx/xx/xx

xx:xx:xx



FRAMING: ESF+D
TX-CLK: INTERNAL

TEST TIME: 000: 00: 18
RATE: 1544 KBIT/S

RX-CLK: 000 ppm
01-REMAIN RAM: 5800

LINE1—M2101 (CRC)

TYPE	COUNT	RATE
BBE	0B	0.000E+00
ES	0B	0%
SES	0B	0%
EFS	18S	100.0%

PgUp<

PgDn>

STOP

DETAIL


8.1.2.9 Event Detail

TEST RESULTS

R

xxxx/xx/xx

xx:xx:xx



RECORD 01

1 OF 1

NO.	TYPE	START TIME	COUNT
0001	CODE	xx:xx xx:xx:xx	1

PgUp<

PgDn>

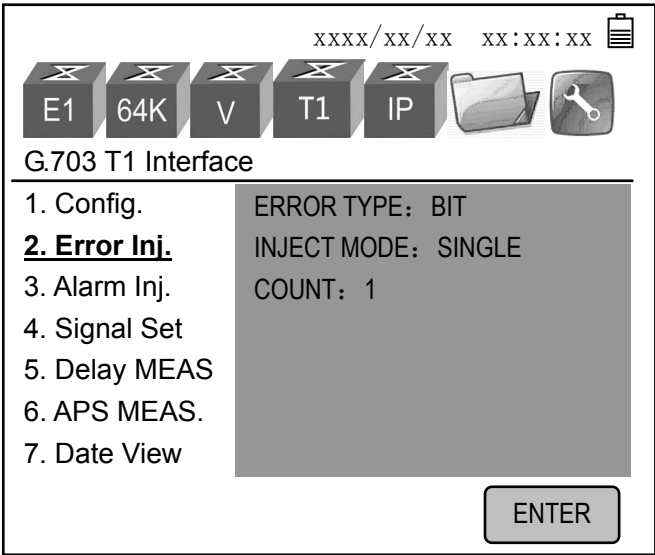
STOP

RETURN

NO.: record events with sequence from small to big, max quantity: 9999 items;
TYPE: error or alarm type, “-1” or “-2” suggests line 1 or line 2;
START TIME: local time of the events, year/month/date;
COUNT: errors quantity or alarm sustained time.

8.2 Error Injection

In the main menu, select “G.703 T1 Interface” then click the cursor key or 2 key to access the Error Injection menu.



Right click cursor key or click “ENTER” to enter error inject settings, as follows,

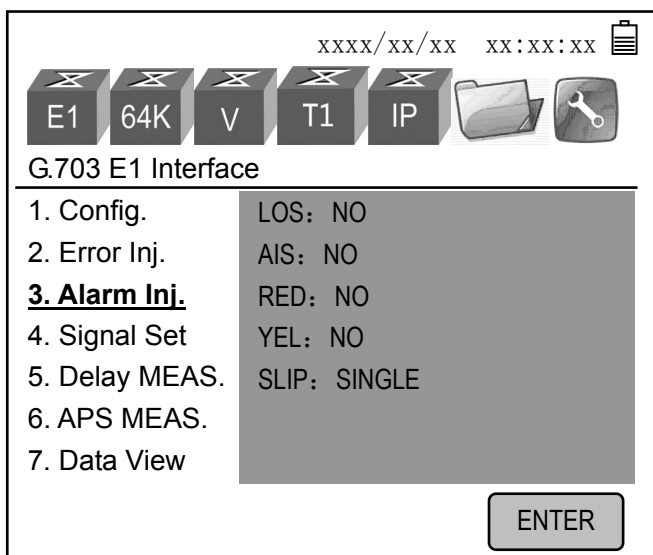
Parameter	Option	Description
ERROR TYPE	CODE	Error type is Code
	BIT	Error type is Bit
	FAS	Error type is FAS
	CRC6	Error type is CRC4

INJECT MODE	SINGLE	Inject signal error
	RATE	Inject error as per rate.
COUNT	1	Via “-1” or “+1”, or click number key enter quantity that for errors that can be injected each time. (0~9)
RATE	1E-04	As per rate 10^{-4} , 10^{-5} , 10^{-6} , 10^{-7} , 10^{-8} inject errors.

Select error inject type, click “Ins” and inject error, soon “Ins” will be suggested in the first line status bar on Screen.

8.3 Alarm Injection

In the main menu, select “G.703 T1 Interface” then click the cursor key or the “3” key to access the Alarm Injection menu.



Click cursor right key or ENTER key access to alarm injection, as below.

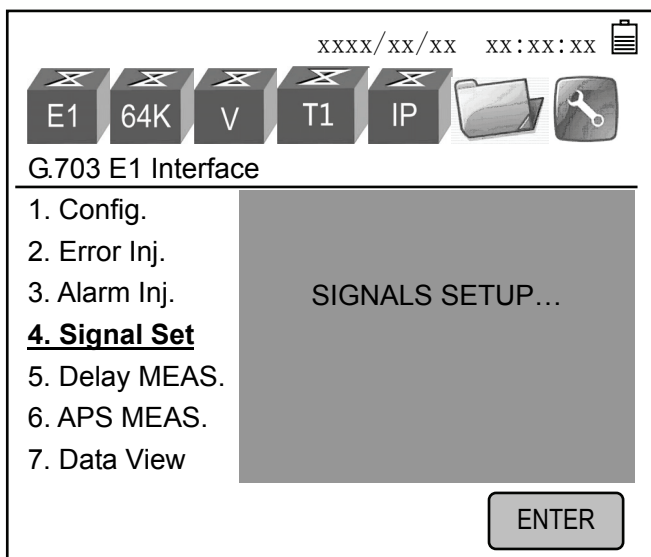
Parameter	Option	Description
Alarm Type	LOS	Loss of signal


	AIS	Alarm indication signal
	RED	RED Indication
	YEL	YEL Indication
	SLIP	Slip code

Move cursor key to the alarm injection, select “YES” or “NO” by soft key, when “YES” selected, there will be “Ins” on the first status bar on screen.

8.4 Signal Set

In the main menu, select “G.703 T1 Interface” then clicks the cursor key or the “4” key to access the Alarm Injection menu.



RESULTS
R
xxx/xx/xx
xx:xx:xx


SIGNALS SETUP(ESF+D)

TX				RX			
	ABCD		ABCD		ABCD		ABCD
01	0101	07	1111	01	0101	07	1111
02	1111	08	1111	02	1111	08	1111
03	1111	09	1111	03	1111	09	1111
04	1111	10	1111	04	1111	10	1111
05	1111	11	1111	05	1111	11	1111
06	1111	12	1111	06	1111	12	1111

1

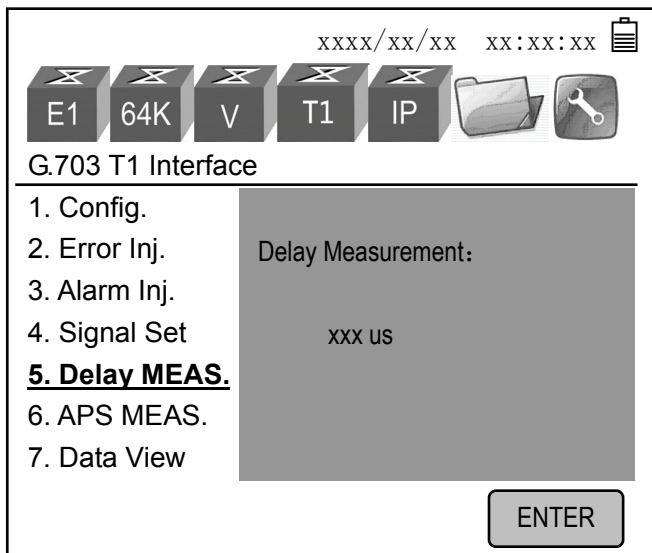
0

PgDn

RETURN

8.5 Delay Measurement


In the main menu, select “G.703 T1 Interface” then clicks the cursor key or “5” key to access the Alarm Injection menu.



Click "ENTER" key access to delay measurement, the value of delay measurement displayed by microsecond.

8.6 APS Measurement

In the main menu, select "G.703 T1 Interface" then clicks the cursor key or "6" key to access the APS Measurement menu.

XXXX/XX/XX XX:XX:XX
 


E1


64K

V

T1

IP





G.703 E1 Interface

1. Config.
2. Error Inj.
3. Alarm Inj.
4. Signal Set
5. Delay MEAS.
- 6. APS MEAS**
7. Data View


APS Measurement:

 xxx ms

ENTER

Click “ENTER” key access to APS measurement that will be displayed with microsecond.

8.7 Data View

XXXX/XX/XX XX:XX:XX
 

LINE1—RECEIVED DATA 1 OF 72

SLOT	BIN	HEX	ASCII
01	00000000	00	0
02	00000000	00	0
03	00000000	00	0
04	00000000	00	0
05	00000000	00	0
06	00000000	00	0
07	00000000	00	0
08	00000000	00	0

PgUp<

PgDn>

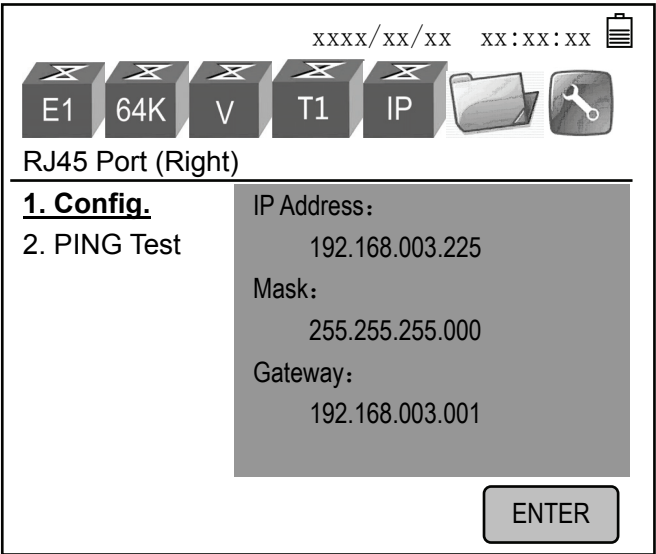
PAUSE

Chapter 9 RJ45 Port Test

A RJ45 Network Interface is available at the right of the instrument, it can test IP PING.

9.1 Configuration

In main menu, choose “RJ45 Port (Right)”, click “ENTER” or cursor downward key to enter “Config.”, as follows,



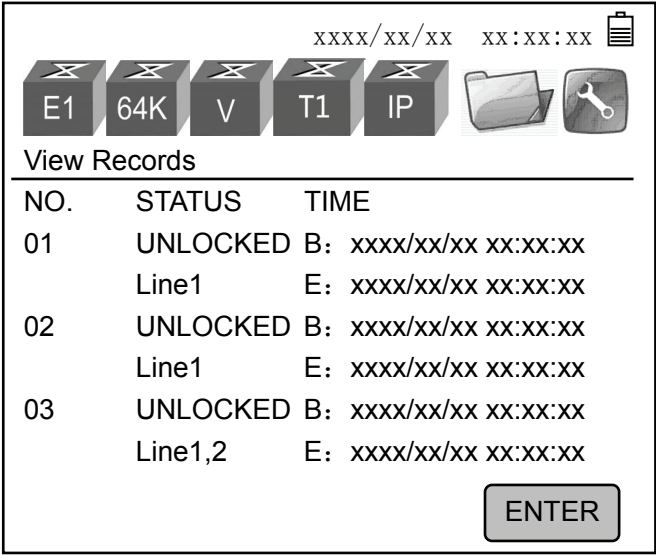
The clicked item will be underlined, then click cursor right key to revise parameter that will be highlighted, software key is the optional item of parameter, which can be confirmed by ENTER key.

After setting up network parameter, connect network cable, then click “PING Test”.

Chapter 10 View Records

All the test results are stored in the internal memorizer, which can be checked through checking Records.

In main menu, choose “View Records”, click “ENTER” key to enter, as follows,



Amongst it,
Records: every record has its record number, the device has capacity of saving up to 20 records, delete or lock any of them by soft key.

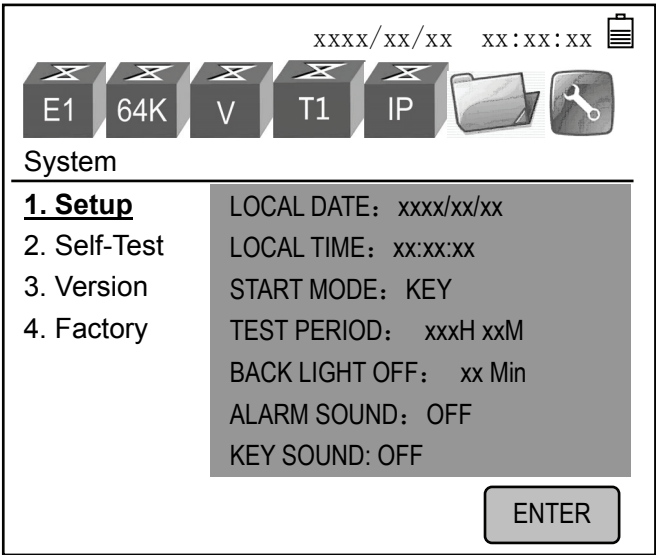
Status: view record status and line 1 or line 2 information.
Time: “B” stands for start time and “E” stands for end time, test results recorded at that period of time.

When select the record for viewing, click “ENTER” to check corresponding indicator that is supposed to be same as the test results, please refer to 4.1.2

Chapter 11 System Setup

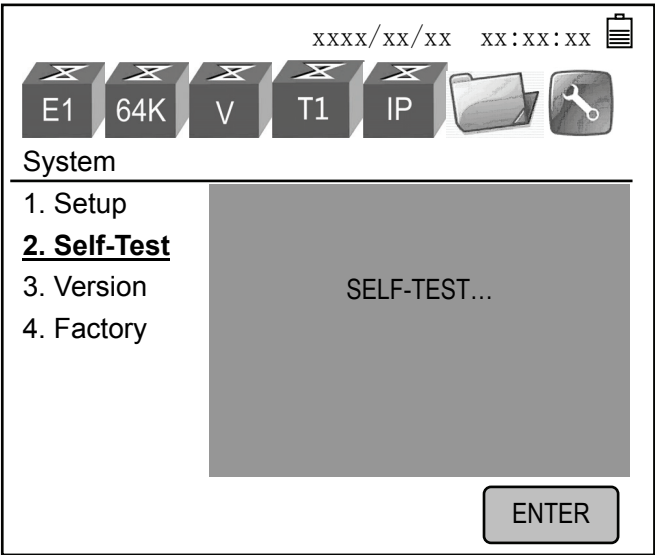
It encompasses comprehensive settings (time, backlight, sound setup, etc.), self-test, version number view and restoring factory settings

11.1 Setup

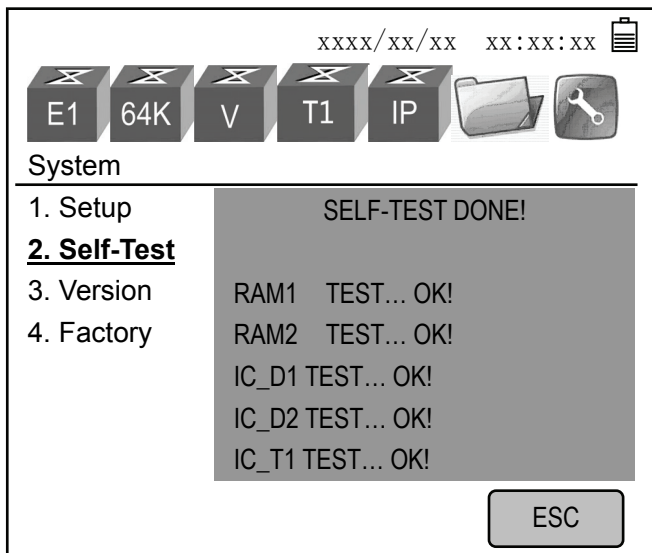


Parameter	Options	Description
LOCAL DATE	0~9	Set Local date
LOCAL TIME	0~9	Set Local Time
START MODE	KEY	Click “key” button to start the test, click “key” button to stop the test.
	TIMER	Timing the start test can configure single or continuous test.
TEST PERIOD	HOURL	1000 hours of revolving test period.
BACK LIGHT OFF	MIN	Set OFF time of LCD backlight
ALARM SOUND	ON/OFF	Set Alarm sound as On/Off
KEY SOUND	ON/OFF	Set Keystroke sound as On/Off

11.2 Self-Test

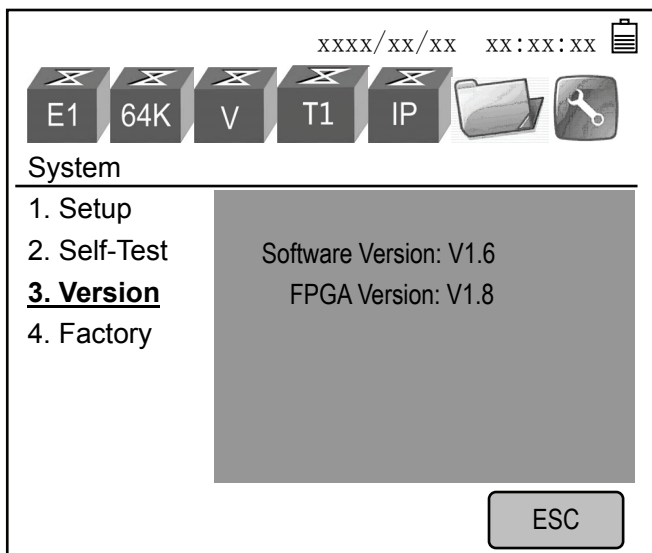


Click ENTER key to start self-test, results are as follows,

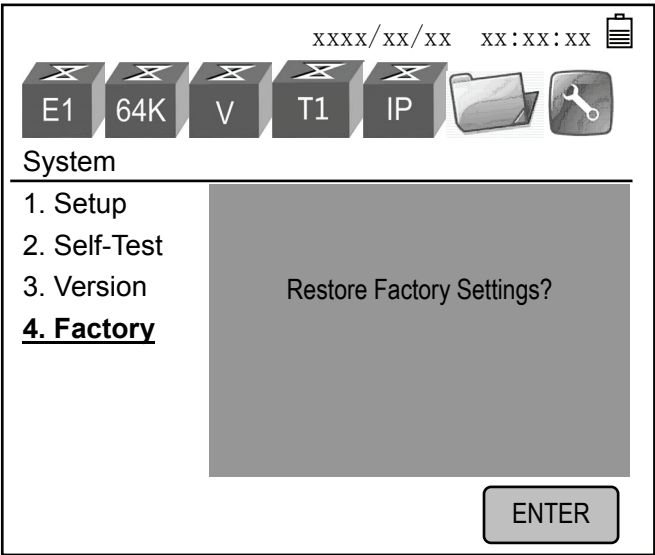


After self-test, internal main chips will be under self-test.

11.3 Version



11.4 Restore Factory Settings

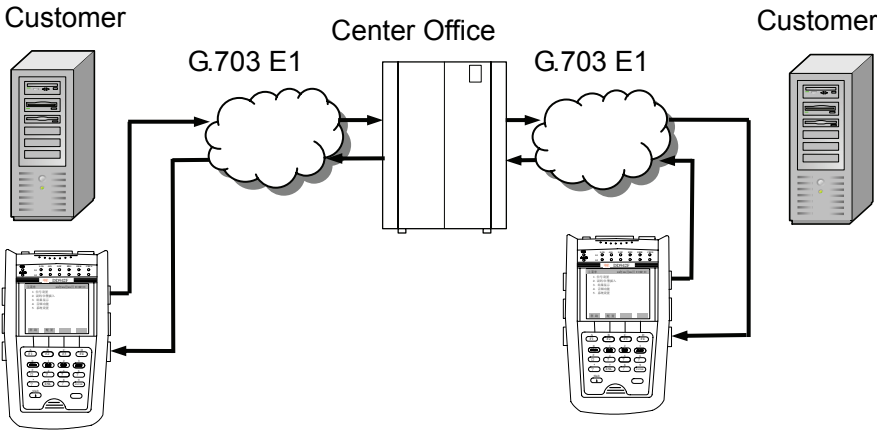


Chapter 12 G.703 E1 Test Application

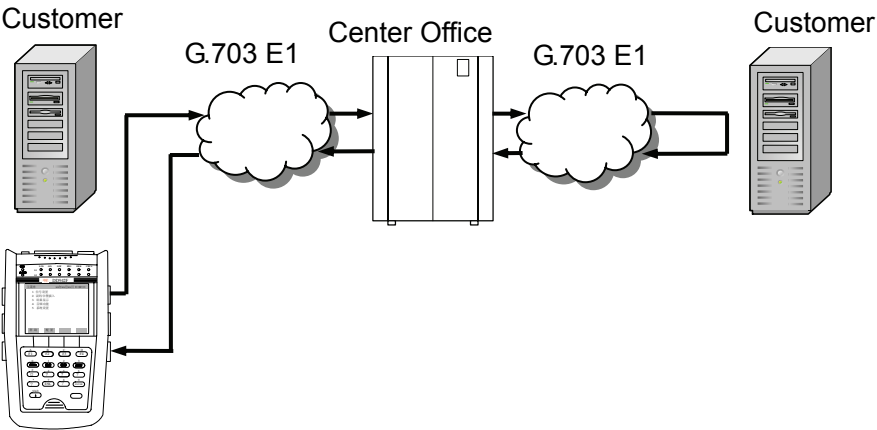
12.1 E1 Out-of-Service test

12.1.1 Connection

1. Remote End-to-end Test



2. Remote Loop Test



12.1.2 Configuration

In the main menu, select “G.703 E1 Interface”-“Config.” and make settings as the chart below,

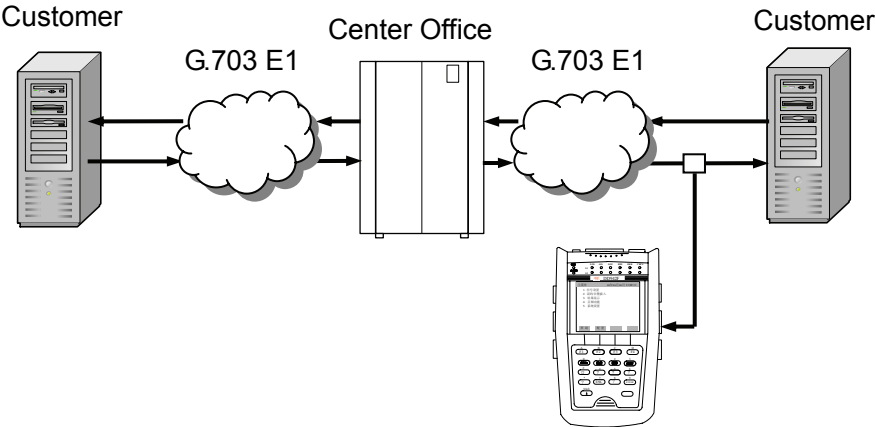
TEST MODE	LINE1
RX PORT	TERM.
FRAMING	UNFRAME
RATE	2048K
PATTERN	2 ¹⁵ -1
TX-CLK	INTERNAL
TEST TYPE	BER
CODE	HDB3

12.1.3 Test

Click "MEAS." key and then "START" key for starting test.

12.2 E1 In-Service Monitoring

12.2.1 Connection



12.2.2 Configuration

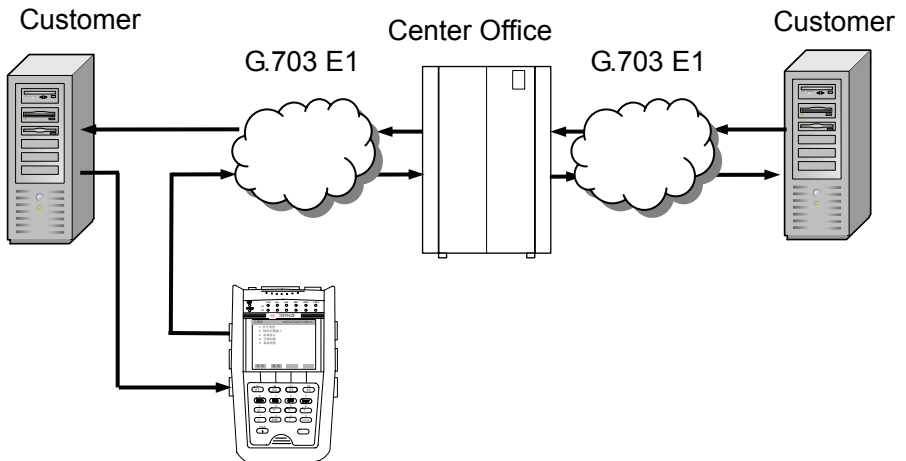
In the main menu, Click "G.703 E1 Interface"-“Config.” and make settings as the chart below,

TEST MODE	LINE1
RX PORT	MONITOR
FRAMING	PCM30C
RATE	2048K
PATTERN	$2^{15}-1$
TX-CLK	L1-RX
TEST TYPE	LIVE
CODE	HDB3

12.2.3 Test

Click "MEAS." key and then "START" key for starting test

12.3 E1 Through Mode Test



12.3.1 Configuration

In the main menu, click "G.703 E1 Interface"-“Config.” and make settings as the chart below,

TEST MODE	LINE1
RX PORT	BRIGDGE
FRAMING	PCM30C
RATE	2048K
PATTERN	$2^{15}-1$
TX-CLK	L1-RX
TEST TYPE	LIVE
CODE	HDB3

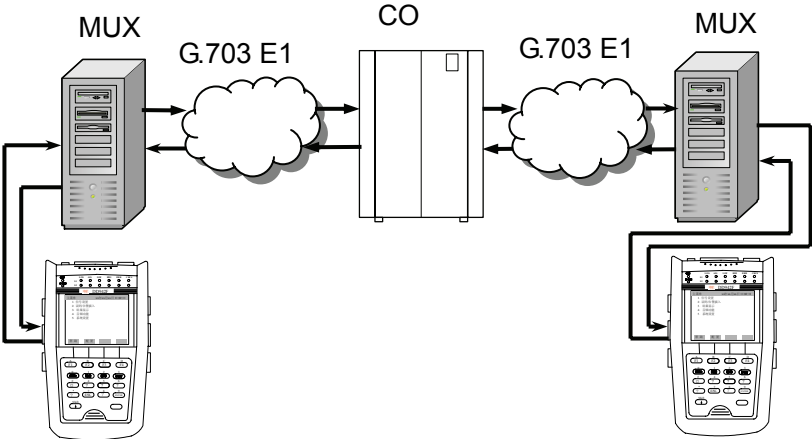
12.3.2 Test

Click "MEAS." key and then "START" soft key to start test.

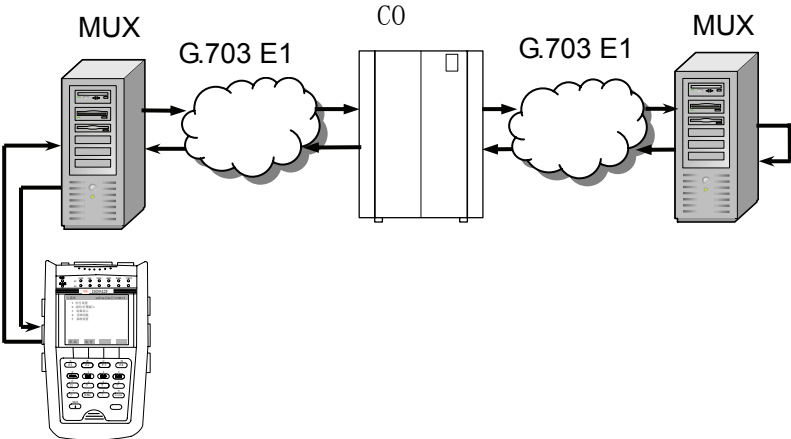
Chapter 13 G.703 64K Test Application

13.1 Connection

1. Remote End-to-end Test



2. Remote Loop Test



13.2 Configuration

In the main menu, click "G.703 64K Interface"- "Config." and make settings as the chart below,

PATTERN	$2^{15}-1$
TX-CLK	INTERNAL

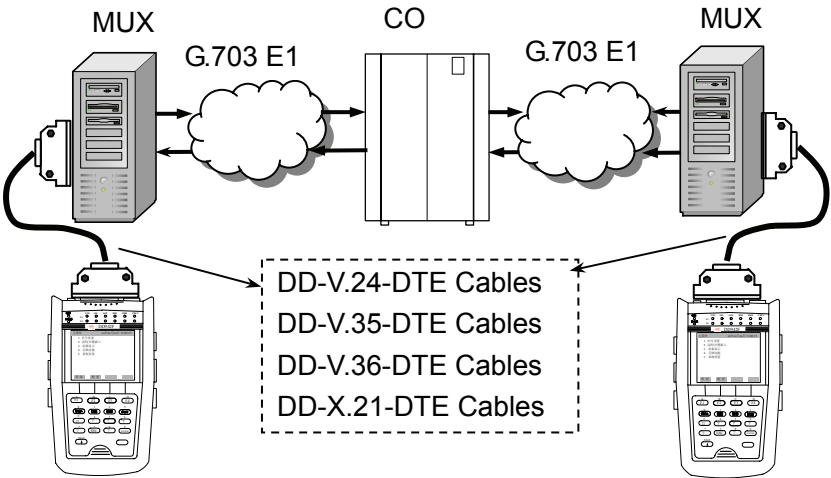
13.3 Test

Click "MEAS." key and then "START" key to start test.

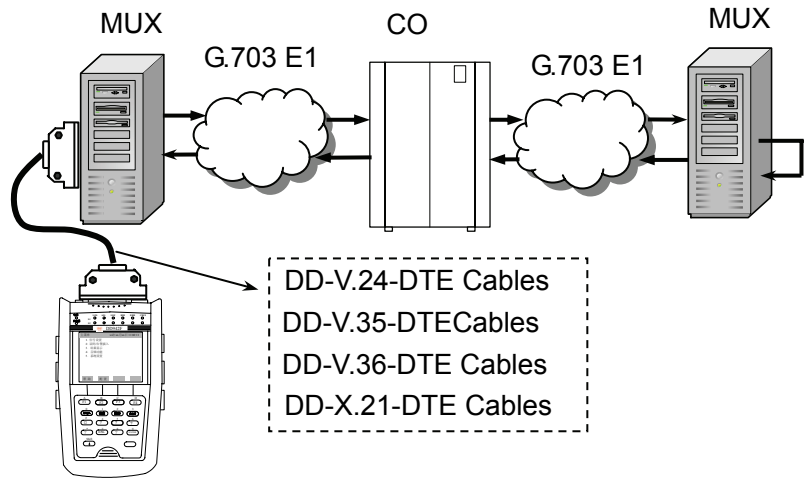
Chapter 14 V Series Interface Test Application

14.1 Connection

1. Remote End-to-end Test



2. Remote Loop Test



14.2 Configuration

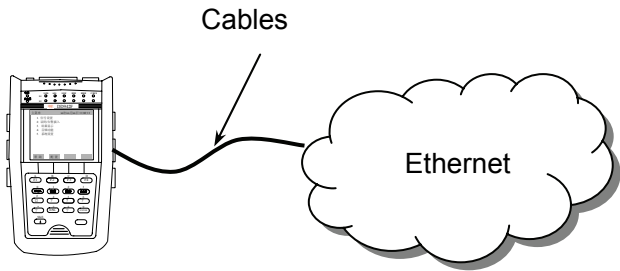
In the main menu, click “V Interface Setup”-“Config.” and make settings as the chart below,

INTERFACE	V.35
MODE	DTE
TYPE	SYNC
RATE	128K
PATTERN	2 ¹⁵ -1
TX-CLK	INTERNAL
TX-CLK POLAR	RISE
RX-CLK POLAR	RISE

14.3 Test

Click "MEAS" key and then "START" soft key to start test.RJ45 Port Test Application

14.4 Connection



14.5 Settings

Only need to set IP Address and Ethernet segment parameter (Subnet Mask & Gateway) of the tester.

14.6 Test

Click "Ping Test", then click the "PING" key for starting test.

Chapter 15 Data Management System

Through RJ45 Network Interface, operation and data exchange can be available in the Data Management System.

15.1 Introduction

Data Management System can achieve all functions between Computer and BER communication.

Through Data Management System software, computer can extract all test data in the memorizer, and saved in the Hard Discs of computer. Standard interface for database is available, which help manage data.

It can emulate manual operation in the platform, control BER-1560, and carry on all operation through Mouse.

15.2 Work Environment

A necessary Configuration is as follows,

CPU	Pentium III 733 or above, IBM PC or compatible computer.
Memory	256M or larger.
Hard Discs	Residual storage: more than 100M
Screen	At least 800×600 16 colors or above.
DVD Drive	16x or above.
Network Interface	At least one Network Interface
System	Windows2000/XP

15.3 Installation

Program software is enclosed in User Discs in Package or sent by

Customer Service. Click “E1 Data Management System” and install it.

15.4 Connection

Through RJ45 network interface, BER-1560 connects PC directly.

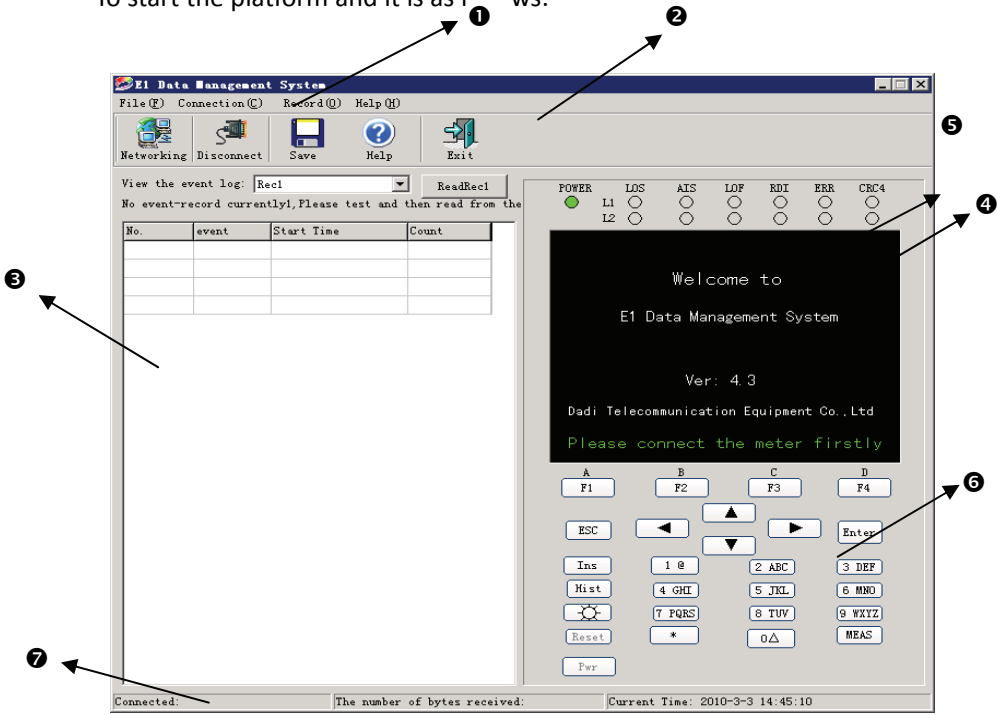
15.5 Enter Data Management System

15.5.1 Start Program

Click “Start” at Windows Bar, choose “Program”, and “E1 Data Management System 1560” to start software. If you have established shortcut on the Table, you can click shortcut to start.

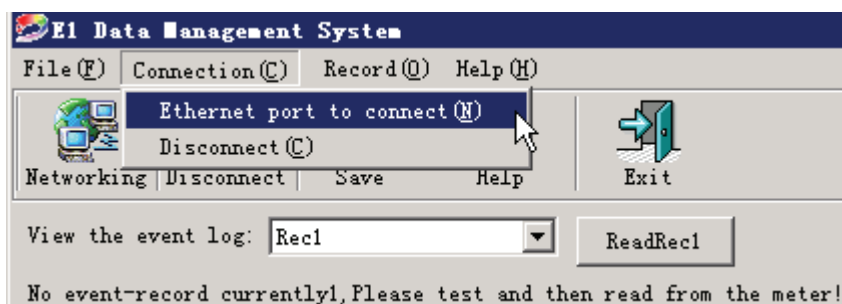
15.5.2 Data Management System Interface

To start the platform and it is as follows:

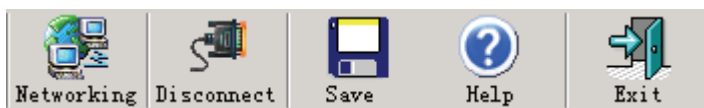


Content:

- 1 Menu Bar: can deal with file and set up meter.



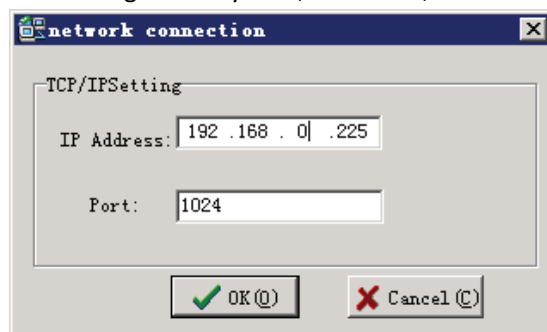
- 2 Toolbar: icon of Menu Bar.



- 3 Record display: display extracted data from BER-1560 memorizer.
- 4 LCD display: synchronize with BER-1560 LCD.
- 5 Indicator Light Display: synchronize with panel indicator light.
- 6 Keystroke: synchronize with panel keystroke.
- 7 Status: display current status of Data Management System, including connection way, Rx bytes, time, etc.

15.5.3 Connection

Enter Data Management System, as follows,



Choose parameter, and click "OK" to connect.

15.5.4 Control the Tester

When connected, please click keystroke to operate it, same way to the actual operation (refer to above Chapters).

15.5.5 Results Display

During test, real time test data will be sent to PC, and the test data will be displayed on PC screen.

The screenshot shows the 'Test Results' window with the following sections:

Test Parameters

View test results: Result1

System Model: PCM31 Record Number: 1

Start Test Time: 2010/03/01 13:37:55 Total test duration (S): 15

Read results1 Save Data

Line 1 / 2 - bit error count / ratio

Line No.	Type	Count	Rate
Line1	code	0B	0.000E+00
Line1	bit	--	--
Line1	FAS	--	--
Line1	CRC4	524320B	0.000E+00
Line1	E_bit	2097184B	0.000E+00

Line 1 / 2 - Alarm Detection

Line No.	Type	Times	Total Time
Line1	LOS	1	15S
Line1	AIS	0	0S
Line1	LOF	--	--
Line1	RDI	--	--
Line1	LOP	0	0S

Line 1 / 2 - G.821 (BIT)

Line No.	Type	Count	Rate
Line1	bit	2097184B	0.00E+00
Line1	ES	64000S	0.00%
Line1	SES	0S	0.00%
Line1	EPS	4294903296S	0.00%
Line1	UAS	15S	100.00%

Line 1 / 2 - G.826 (FAS/CRC4)

Line No.	Type	Count	Rate
Line1	EB	--	--
Line1	BEE	--	--
Line1	ES	--	--
Line1	SES	--	--
Line1	UAS	--	--

Line 1 / 2 - G.826 (E_BIT)

Line No.	Type	Count	Rate
Line1	EB	2097184B	4.768E-07
Line1	BEE	2097184B	4.768E-07
Line1	ES	0S	0.00%
Line1	SES	2097184S	100.00%
Line1	UAS	4292870127S	-13981127.00%

Line 1 / 2 - M2100 (FAS/CRC4)

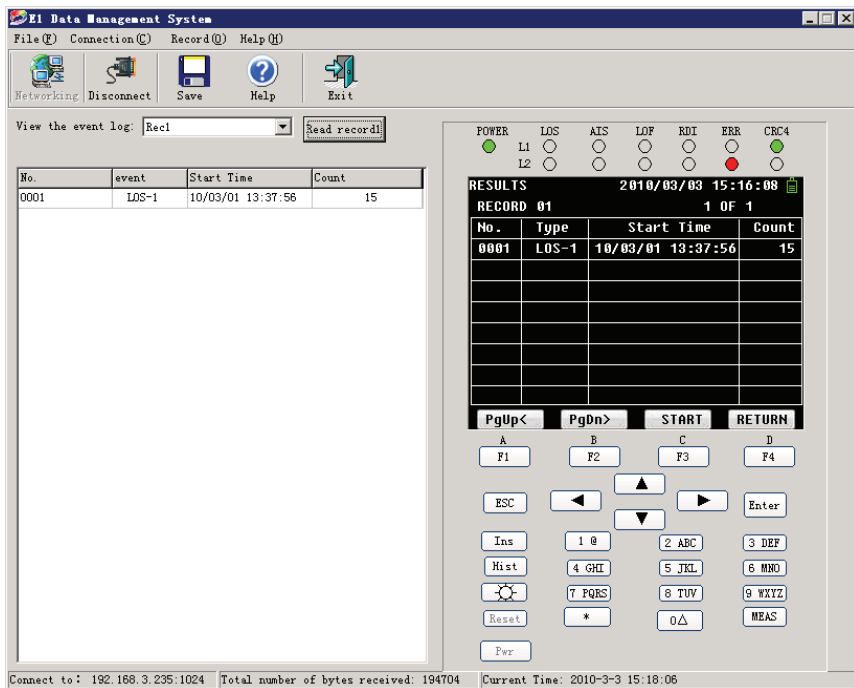
Line No.	Type	Count	Rate
Line1	ES	2097184S	100.00%
Line1	SES	0S	0.00%
Line1	EPS	0S	0.00%

In the emulation interface, you can see data same to the data on LCD of BER-1560.

RESULTS	2010/03/03 15:11:06	
FRAMING: PCM30C	TX-CLK: INTERNAL	
TEST TIME:000:00:00	RATE: NX64K	
Rx-CLK: 000 ppm	01--Remain RAM:5790	
LINE1--ERROR BIT COUNT/RATE		
TYPE	COUNT	RATE
CODE	0B	0.000E+00
BIT	0B	0.000E+00
FAS	0B	0.000E+00
CRC4	0B	0.000E+00
E_BIT	0B	0.000E+00
PgUp<	PgDn>	START
		DETAIL

15.5.6 Record Operation

When data comes in memorizer, you can click “Read Records” to operate. The extracted records will display in the bars, to save it by click, or you can click “Exit” to exit the system.



EXCEL and TXT format are available for the storage.

Chapter 16 Summary Of Faults

Faults	Cause	Methods
Fail to switch on	Battery electricity exhausted	Connect the external power to charge the battery for several minutes prior to startup
Abnormal Keystroke Function	Shift key clicked	Click Shift key
In the PCM30 of in-service monitoring, "LOF" alarm bright	System set as PCM31	Set the test system as PCM31 for the tester
LOS alarm light bright	No Input signal	Check the input cable
Alarm or error existing always	The instrument is in the state of error or alarm insertion.	Cancel the status of error or alarm insertion.
Errors appear all the time in the in-service monitoring.	Test mode selected as BER Mode	Select the test mode as "Live" mode in "Config".
When connected with network cable, Ping is not OK.	1. Not used cross-over network cable. 2. Not set IP Address correctly	1. Use the cross-over network cable allocated by the factory 2. Set IP Address correctly
There are faults with unknown causes	Possibly caused by the confusion of settings.	Switch off once and switch on again. Restore Factory Settings.(refer to 9.4)

Chapter 17 Precaution

- The instrument is required to be stored in the dry place with the temperature between $-5^{\circ}\text{C} \sim 40^{\circ}\text{C}$.
- In case you don't use the instrument for a long time, please put it in the plastic bag with a drier, and at the same time put it in the instrument bag.
- Electrify the instrument every two months with no less than 2 hours each time. In case of wet & rainy seasons, electrify it one time per week.
- Precautions for LCD safekeeping and maintaining.
 - No hands or other hard objects touch the LCD screen.
 - Clean the screen gently with a piece of soft cloth, rather than water, ketone and aromatic.
 - Don't wipe the instrument with alcohol, thinner, aromatic and other organic solvent.

Chapter 18 Technical Parameter

18.1 G.703 E1 Interface Technical Parameter

- Bit Rate: 2048Kbit/s
- Internal Clock: $2048\text{KHz} \pm 10\text{ppm}$
- Test Code: HDB3/AMI code
- Framing: PCM30 / PCM30 CRC/ PCM31 / PCM31 CRC
- Test Pattern: PRBS 2n-1(n=6,9,11,15,20,23), all 0s, all 1s, 1010, 16-bit user code

- Error Injection Type: bit, Code, CRC4, FAS
- Error Injection mode: Single, Multiple, Rate 1×10^{-n} ($n=3,4,5,6,7,8$)
- TX-Clock: External Signal Extraction, Internal clock
- Alarm Detection: LOS, AIS, LOF, RDI
- Clock Offset: -125ppm~125ppm
- Signal Output: Unbalanced BNC, Impedance 75Ω
Triple-Pin Balance 120Ω
- Signal Input: Unbalanced BNC, Impedance 75Ω/High
Impedance(>2KΩ)
Triple-Pin Balance 120Ω
- External Clock: compliance to ITU-T G.703 criterion.

18.2 G.703 64K Interface Technical Parameter

- Bit Rate: 64kbit/s
- Internal Clock: 64kHz±10ppm
- Code: AMI
- Test Pattern: PRBS 2n-1 ($n=6,9,11,15,20,23$), all 0s, all 1s, 1010, 16-bit user code.
- Error Injection: single, Rate 1×10^{-n} ($n=3, 4, 5, 6, 7, 8$)
- Alarm monitor: compliance to ITU-T G.704 criterion
- Signal Interface: compliance to ITU-T G.703 criterion
Signal Output: Triple-Pin Balance, Impedance 120Ω
Signal Input: Triple-Pin Balance, Impedance 120Ω
- Jitter Tolerance: compliance to ITU-T G.823 criterion
- Error Analysis: compliance to G.821 and ITU-T G.826 criterion

18.3 V Series Interface Technical Parameter

- Bit Rate: 50bit/s~2048kbit/s
- Code: binary code stream

- Test Pattern: PRBS $2n-1$ ($n=6,9,11,15,20,23$), all 0s, all 1s, 1010, 16-bit user code.
- Error Injection: single, Rate 1×10^{-n} ($n=3, 4, 5, 6, 7, 8$)
- Interface Criterion: V.24/RS232, V.35, V.36/RS449, X.21
- Interface Electrical Characteristics

Interface	Signal Line	Electrical Characteristics
V.24/RS232	data signal	V.28
	clock signal	V.28
	control signal	V.28
V.35	data signal	V.35
	clock signal	V.35
	control signal	V.28
V.36/RS449	data signal	V.11
	clock signal	V.11
	control signal	V.11
X.21	data signal	V.11
	clock signal	V.11
	control signal	V.11

18.4 G.703 T1 Interface Technical Parameter

- Max Bit rate: 1544bit/s
- Internal clock: 1544 kHz ± 10 ppm
- Line code: B8Zs or AMI
- Test pattern: PRBSn ($n = 6, 9, 11, 15, 20, 23$, All 0s, All 1s, 1010, 16-bit user word)
- Error injection: Single, Rate: 1×10^{-n} $n = 3, 4, 5, 6, 7$
- Framed / Unframed, D4, ESF
- Connectors: RJ-45C nominal 100 Ω balanced

- Bridged input: Unbalanced $2k\Omega$ (nominal)
- Clock source: Internal or Recovered from Received Data

18.5 Others

- Battery: Rechargeable Lithium Battery(8.4V/4400mAh)
- Battery Operation Time: About 10 hours
- Battery Charging Time: About 6 hours for full discharge
- External Power: Power Adapter
- Test Data Storage Time: 10 years without external power supply
- Storage Capacity: 2Mbit
- Stored Records: 20 independent records
- Communication Interface: RJ45 Ethernet Interface
- Ambient Temperature:
Operating Temperature Range: $-10^{\circ}\text{C} \sim +50^{\circ}\text{C}$
Storage Temperature Range: $-20^{\circ}\text{C} \sim +70^{\circ}\text{C}$
- Dimension(L × W × H): 190mm × 108mm × 50mm
- Weight: 1.5kg

Chapter 19 V Series Expansion Interface

V Series Interface is a plug with DB25, to interpret signal as follows,

No.	Sign	Explanation	I/O
1	P GND	Protection Ground	
2	TXD	Tx data (A)	O
3	RXD	Rx data (A)	I
4	RTS	Request Tx (A)	O
5	CTS	Confirm Tx (A)	I
6	DSR	Data Equipment Preparation (A)	I
7	S GND	Signal Ground	
8	DCD	Rx line signal test (A)	I
9	SCR (B)	Rx signal timing (B)	I
10	DCD (B)	Rx line signal test (B)	I
11	XCLK (B)	Tx signal timing (B(DTE))	O
12 (*)	SCT (B)	Rx external clock(B) / Tx signal timing (B)	I/O
13	CTS (B)	Confirm Tx (B)	I
14	TXD (B)	Tx data (B)	O
15 (*)	SCT	Rx external clock(A)/Tx signal timing(A)	I/O
16	RXD (B)	Rx data (B)	I
17	SCR	Rx signal timing (A)	I
18	NC	Empty	
19	RTS (B)	Request Tx (B)	O
20	DTR	Data Terminal Preparation (A)	O
21	NC	Empty	
22	DSR (B)	Data Equipment Preparation (B)	I
23	DTR (B)	Data Terminal Preparation (B)	O
24	XCLK (A)	Tx signal timing (A(DTE))	O
25	NC	Empty	

Service Information

Web Site: www.lzdd.com

Business Telephone: (0086)-10-82511182

Technical Support Telephone: (0086)-10-82867177